

JUNE 2015

COUNCIL OF STATE AND
TERRITORIAL EPIDEMIOLOGISTS

Assessment of State Activities in Non-Infectious Environmental Health Exposure Monitoring and Investigation



Acknowledgements

The Council of State and Territorial Epidemiologists (CSTE) would like to acknowledge the dedication of the working group of CSTE members that developed the Sentinel Assessment and subsequent recommendations provided within this document. Additionally, the working group would like to acknowledge the contribution of Kristina W. Kintziger, PhD, Florida Department of Health, for data analysis and authorship of this publication.

This publication was supported by Cooperative Agreement Number 1U38OT000143 from CDC. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.

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Executive Summary

During December 2013–March 2014, the Council of State and Territorial Epidemiologists with the National Center for Environmental Health at the Centers for Disease Control and Prevention assessed state and several large local health departments to describe current processes for and experiences with the monitoring and investigation of environmental exposures and associated acute health effects. The results of this assessment demonstrate environmental health-related activities that are being successfully implemented in many health departments and can be used to build environmental health investigation and response capacity nationwide.

Results

- Forty-five (80.4%) of 56 agencies completed the assessment.

1. Environment-Related Health Conditions

Note: Eleven environment-related health conditions were assessed including lead toxicity in children, lead toxicity in adults, mercury toxicity, arsenic toxicity, cadmium toxicity, acute pesticide illness/injury, acute respiratory disease related to chemical exposure (e.g., chemical pneumonitis, acute asthma exacerbation), acute disease cluster possibly linked to an environmental exposure, methemoglobinemia, carbon monoxide poisoning, and hyperthermia morbidity and mortality.

- Agencies indicated that they collect data on a variety of health conditions, even if the condition is not legally reportable within the jurisdiction (e.g., heat-related morbidity and mortality data are collected by 33% but legally reportable in only 7% of jurisdictions).
- Jurisdictions varied widely by which conditions they monitored. For example, almost all responding jurisdictions indicated that they collect data on child lead toxicity (96%) while only 22 percent monitored for methemoglobinemia.
- For 6 of the 11 conditions of interest, <50% of respondents indicated that case report data for these conditions are summarized and made public each year.
- For all health conditions, <36% of respondents reported summarizing and making follow-up exposure investigation results publicly available.
- Reporting sources and follow-up procedures varied, although physician and laboratory reporting, case-patient interview, and exposure investigation were most common.
 - Poison control reporting (56%) was common for acute pesticide illness, while phone calls from citizens (51%) were common for acute disease clusters.
 - Medical record reviews were frequently used for acute respiratory disease (55%), acute disease clusters (52%), and methemoglobinemia (60%).
- Lead toxicity for children and adults had the greatest impact on environmental health activities in terms of case numbers reported annually and weighted by population size; >50% of respondents receive ≥100 reports annually for these conditions.
- Although few cases were reported annually, methemoglobinemia and acute disease clusters triggered investigations most commonly, with over 50% of cases investigated.

2. Environmental Exposure Events

Note: Nine environmental exposure events were assessed including mold, radiation releases or exposures, chemically contaminated products, chemically contaminated food, chemically contaminated water, mercury spills, carbon monoxide releases, pesticides misapplications or accidental exposures, and other chemical spills or releases.

- Chemical contamination of water (80%) and food (73%) and mold-related events (76%) were the most common exposures for which responding agencies collected data.

- Exposure event data were infrequently summarized and made public across all types of events; the most common exposure events summarized were carbon monoxide releases (41%) and chemical contamination of water (39%).
- Phone calls from citizens or referrals from external agencies were common sources of event reports, and referrals to appropriate regulatory agencies and technical assistance or telephone consultation were common follow-up procedures used.
 - Epidemiologic investigations occurred most frequently for chemically contaminated food (73%), and site visits were most common for radiation releases or exposures (71%) and chemically contaminated food (70%).
- Mold exposure events had the greatest impact on environmental health activities in terms of the number of events reported annually and weighted by population size; 62% of respondents receive ≥ 100 case reports annually for mold exposures.
- Although few events are reported annually, chemical contamination of water and food trigger exposure investigations most commonly, with about 80% of events investigated.

3. *Syndromic Surveillance as a Tool for Environmental Monitoring and Response*

- More than half (24 [53.3%]) of respondents reported not using syndromic surveillance for any of the 11 health conditions of interest.
- Ten (22%) agencies reported using syndromic surveillance for only 1 health condition, and 11 (24%) agencies use it for >1 condition.

4. *Effect of Radiation Control Agency Location on Radiation Event Reporting and Activities*

- Fifty-seven percent of responding jurisdictions reported having their radiation control agency within the health department.
 - These agencies had more reporting sources and follow-up procedures in place and were more likely to collect data on these events than were those whose radiation control agency was external to the health department.

5. *Resources and Barriers to Monitoring and Response*

- Federal monies were a common source of funding for most respondents; 42% reported receiving Environmental Public Health Tracking (EPHT) funding and 49% National Institute for Occupational Safety and Health (NIOSH) funding.
- Funding source was associated with the percentage of case or event reports triggering case investigations or follow-up actions.
 - Both EPHT- and NIOSH-funded jurisdictions were more likely to conduct case investigations on a proportion (1%–49%) of all reported cases, while non-funded states were more likely to report no follow-up of case reports.
- An average of 7.5 total full-time equivalent (FTE) employees per agency were dedicated to environmental illness, injury, exposure, or contamination monitoring activities (6.1 FTEs designated as environmental health and 1.4 FTEs as occupational health).
 - Jurisdictions with EPHT funding had more environmental health FTEs (9.1 vs. 3.9; $p = 0.05$), and significantly more total FTEs (10.9 vs. 4.5; $p = 0.03$) devoted to environment-related conditions and events.
- Other major barriers included inadequate resources to support activities (87%) and restrictions/limitations on collecting data on non-reportable diseases (49%).
- Most (78%) respondents were interested in expanding current non-infectious environmental health activities if funds and necessary resources are made available.
- Fifty-eight percent reported being willing to share their standard monitoring and response procedures, and 27% report having no standard procedures to share.

Recommendations

1. Focus on greater public dissemination of investigation results of case reports and exposure events.
2. Develop a repository of procedures and tools used by the 35 jurisdictions that were willing to share these items, and make the repository available to all state and local health departments.
3. Provide guidance on strategies for monitoring of and response to non-reportable health conditions.
4. Conduct within-agency training on current reporting requirements and practices.
5. Promote the use of syndromic surveillance as a source for environment-related health conditions.
6. Expand the current levels of EPHT and NIOSH funding nationally.

Introduction

Environmental epidemiology focuses on a broad range of health outcomes caused by environmental exposure to physical, chemical, or biological agents.¹ Environmental exposures can include chemicals; radiation; weather; natural or human-made disasters; and contamination of foods, pharmaceuticals, or other products. Potential health effects from these exposures range from lead, heavy metal, and carbon monoxide poisoning to methemoglobinemia and hyperthermia. Some health outcomes are national notifiable diseases or reportable by individual state mandate. Given the wide array of possible exposures and health outcomes, it stands to reason that methods or processes for monitoring and investigating these events would vary across jurisdictions.

The scope of state environmental health applied epidemiology activities in non-infectious conditions has never been systematically assessed. Therefore, the Council of State and Territorial Epidemiologists (CSTE), in collaboration with the National Center for Environmental Health at the Centers for Disease Control and Prevention (CDC), undertook a national assessment to determine current processes for and experiences with the monitoring and investigation of environmental exposures and associated acute non-infectious health effects. The purpose of this assessment was to better understand how these processes have been standardized in terms of response algorithms, case definitions, and investigation forms and protocols; how agencies store, share, and use this information; and how the activities are linked with related programs, such as occupational and injury epidemiology. CSTE and its partners will use the results from this assessment to identify and share activities that could reasonably be done in most state and local health departments, help raise awareness of environmental health issues, and build state and local response capacity.

¹ Porta M, editor. A dictionary of epidemiology, 5th ed. New York: Oxford University Press; 2008.

Methods

Assessment Development and Administration

CSTE National Office staff and CSTE's Environmental Health Subcommittee members developed the assessment questions. These questions collected information about sources of identification of cases or events, estimated number of cases or events reported annually, follow-up and investigation triggers and procedures, and data reporting and sharing. Topic areas were broken down into health conditions and exposure events. Respondents were also given the option to include and respond to 2 other conditions or events monitored by their jurisdictions.

Eleven specific ***health conditions*** were assessed:

- 1) Lead toxicity in children;
- 2) Lead toxicity in adults;
- 3) Mercury toxicity;
- 4) Arsenic toxicity;
- 5) Cadmium toxicity;
- 6) Acute pesticide illness or injury;
- 7) Acute respiratory disease related to chemical exposure (e.g., chemical pneumonitis, acute asthma exacerbation);
- 8) Acute disease clusters possibly linked to an environmental exposure;
- 9) Methemoglobinemia;
- 10) Carbon monoxide poisoning; and
- 11) Hyperthermia morbidity and mortality.

Nine environmental types of ***exposure events*** were assessed:

- 1) Mold;
- 2) Radiation releases or exposures;
- 3) Chemically contaminated products;
- 4) Chemically contaminated food;
- 5) Chemically contaminated water;
- 6) Mercury spills;
- 7) Carbon monoxide releases;
- 8) Pesticide misapplications or accidental exposures; and
- 9) Other chemical spills or releases.

Additional questions assessed available full-time equivalent (FTE) employees dedicated to environmental health; barriers to monitoring and response; interest in expanding environmental health activities; and willingness to share procedures and practices with CSTE and other states. Questions were pilot tested before administration. Assessment questions complete with skip patterns are found in Appendix A.

Assessments were administered by email in December 2013 and January 2014; additional follow-up with non-responders was conducted through March 2014 to improve the response rate. Assessments were emailed to the environmental health directors or environmental health point-of-contacts of all 50 states and a representative of local jurisdictions, including Washington DC, and the 5 largest US cities (Chicago, Houston, Los Angeles, New York City, and Philadelphia). Persons receiving the assessment were asked to have the assessment completed by someone in their department considered most knowledgeable about the environmental epidemiology activities within the agency. Data were collected by using Epi Info 7 (CDC, Atlanta, GA). Before analysis, CSTE staff linked assessment responses with information

from other sources by jurisdiction, including Environmental Public Health Tracking (EPHT) and National Institute for Occupational Safety and Health (NIOSH) funding, State Reportable Conditions Assessment (SRCA) results, and location of Radiation Control Program agencies within each jurisdiction. Additionally, CSTE staff conducted follow-up with individual respondents for clarification on responses, as needed. Assessment data were then de-identified for analysis.

Definitions

The specific definitions developed for this assessment are listed below. Additional clarifications, including examples, on these definitions are found in Appendix A.

1. Environment-related diseases and injuries: acute health conditions for which the main causes involve probable or definitive environmental exposures.
2. Environmental exposure events: acute exposures (confirmed or possible) to non-infectious agents or conditions in the environment.
3. Notification: any report, whether solicited under disease or exposure reporting mandates, obtained through established notification mechanisms, or unsolicited.
4. Monitoring: ongoing efforts related to the detection, handling, and collection of reports on non-infectious, environment-related acute illnesses or injuries, exposures, contaminated products, or environmental spills/releases.
5. Case-based: individual records.
6. Exposure investigation: follow-up to report(s) of disease or an environmental exposure event to collect information to determine what actions need to be initiated to prevent further public health impact.

Impact Measure of Health Effects and Exposure Events on Environmental Health Activities

To acquire a better understanding of the impact of each of these health effects and exposure events, a ranking system was derived on the basis of the number of cases reported annually and weighted by population size. Number of cases was categorized into 3 groups according to number of cases reported annually (1–100 cases, 101–1,000 cases, and >1,000 cases) and a weight value was applied (Table 1). The population of the responding agency's jurisdiction was based on US Census 2010 estimates and categorized into quartiles (Table 2). The product of the weights was used as a measure of impact for the health effects or exposure events on the total environmental health related activities of an agency.

Table 1. Ranking System: Number of Cases Reported Annually

Number of Cases	Category	Weight
1–100 Cases	Low	1
101–1,000 Cases	Medium	2
>1,000 Cases	High	3

Table 2. Ranking System: Population Size Based on US Census 2010 Estimates

Quartile of Population	Population Range	Weight
Quartile 1	563,626–1,696,997	1
Quartile 2	1,696,998–4,085,221	2
Quartile 3	4,085,222–6,636,085	3
Quartile 4	6,636,086–37,253,953	4

Data Cleaning and Statistical Analysis

Because automatic skip patterns were not used in the assessment design, inconsistent answers were possible for some of the hierarchical questions related to the health conditions (Question 2) or exposure events (Question 4) of interest. For example, if a respondent reported that his/her agency does not collect data on the condition or event, the assessment instructed him/her to move to the next condition or event. However, the sub-questions were still available for answering. During data cleaning, it was necessary to make certain assumptions to ensure consistency in the denominator across responses for a given condition or exposure event. Agencies that reported not collecting data on a condition or exposure event but then answered subsequent questions were marked as collecting data if an estimated number of annual cases or events (Questions 2c and 4 b) were reported. Otherwise, these agencies were marked as not collecting data on the condition or event. For all sub-questions (i.e., Questions 2c–h and 4b–f), the denominator was based only on the respondents who reported collecting data on the condition or event. Other inconsistencies were decided on a case-by-case basis in accordance with the totality of the responses for a given condition or event.

For all categorical assessment questions, univariate descriptive statistics were calculated. This included frequency and percentages for categorical responses, and means and standard deviations (SD) or range for continuous responses. Stratified analysis was conducted for specific covariates of interest, and bivariate statistics were calculated, including *t* tests for continuous and chi-square or Fisher exact tests for categorical variables. P values are reported where appropriate. Statistical analyses were conducted using Epi Info 7 (CDC, Atlanta, GA) and SAS v9.3 (SAS Institute, Cary, NC) by using a Type I error rate of 0.05.

Results

Of the 56 health departments assessed, 45 (80.4%; 44 states, 1 local jurisdiction) completed the assessment. The primary respondents for this assessment were 15 (33.3%) division directors or bureau chiefs; 11 (24.4%) epidemiologists, environmental health scientists, or toxicologists; 9 (20.0%) State Epidemiologists; and 9 (20.0%) section leads, supervisors, or program managers (one respondent did not provide role).

Environment-Related Health Conditions

This section describes state and local agencies' processes for monitoring and follow-up of environment-related health effects by the condition of interest. This information includes the reporting of these conditions (Table 3), sources for identification of persons with the health condition of interest (Table 4), and procedures available for follow-up (Table 5).

Across all conditions, reporting sources and follow-up procedures varied somewhat, although physician and laboratory reporting and case-patient interview and exposure investigation were the most commonly cited unless otherwise noted. Table 6 provides estimates of the number of cases and the proportion of case reports that trigger investigation annually. We also analyzed whether the proportion of case reports triggering investigation differed by whether the health condition of interest is legally reportable. No significant differences were identified for any of the health conditions. For a full summary with detailed response counts for each question collected on each health condition individually, see Appendix B.

Table 3. Reporting of Environment-Related Health Conditions

Condition	Legally reportable ¹		Agency collection of data ¹		Data summarized & reported			
					Cases ²		Investigations ²	
	No.	%	No.	%	No.	%	No.	%
Lead toxicity (child)	40	88.9	43	95.6	32	74.4	13	30.2
Lead toxicity (adult)	37	82.2	41	91.1	25	61.0	7	17.1
Mercury toxicity	21 ³	46.7	25	55.6	13	52.0	9	36.0
Arsenic toxicity	18 ³	40.0	22	48.9	9	40.9	6	27.3
Cadmium toxicity	15 ³	33.3	18	40.0	7	38.9	3	16.7
Acute pesticide illness/injury	25 ³	55.6	30	66.7	16	53.3	9	30.0
Acute respiratory disease from chemical exposures	16 ³	35.6	20	44.4	8	40.0	3	15.0
Acute disease cluster from environmental exposures	19 ³	42.2	27	60.0	10	37.0	11	40.7
Methemoglobinemia	5 ³	11.1	10	22.2	3	30.0	1	10.0
Carbon monoxide poisoning	15 ³	33.3	23	51.1	14	60.9	3	13.0
Hyperthermia (morbidity/mortality)	3 ³	6.7	15	33.3	8	53.3	1	6.7

¹Of all 45 respondents.

²Of respondents reporting that data are collected on the condition of interest.

³Includes jurisdictions where only occupational cases are reportable.

Table 4. Sources for Identification of Persons with Health Conditions of Interest¹

Condition	Physician reporting		Lab reporting		Poison control reporting		Syndromic surveillance		External agency referral		Review of existing data		Phone call from citizen	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lead toxicity (child)	32	71.1	43	95.6	5	11.1	2	4.4	13	28.9	2	4.4	12	26.7
Lead toxicity (adult)	29	64.4	40	88.9	6	13.3	3	6.7	12	26.7	2	4.4	9	20.0
Mercury toxicity	20	44.4	18	40.0	14	31.1	4	8.9	11	24.4	2	4.4	11	24.4
Arsenic toxicity	16	35.6	18	40.0	10	22.2	4	8.9	9	20.0	2	4.4	10	22.2
Cadmium toxicity	12	26.7	18	40.0	6	13.3	4	8.9	6	13.3	2	4.4	6	13.3
Acute pesticide illness/injury	23	51.1	18	40.0	25	55.6	3	6.7	23	51.1	9	20.0	17	37.8
Acute respiratory disease from chemical exposures	17	37.8	8	17.8	11	24.4	3	6.7	14	31.1	3	6.7	13	28.9
Acute disease cluster from environmental exposures	22	48.9	14	31.1	15	33.3	11	24.4	21	46.7	5	11.1	23	51.1
Methemoglobinemia	9	20.0	8	17.8	6	13.3	4	8.9	6	13.3	1	2.2	6	13.3
Carbon monoxide poisoning	18	40.0	11	24.4	13	28.9	10	22.2	10	22.2	8	17.8	10	22.2
Hyperthermia (morbidity/mortality)	4	8.9	0	0.0	0	0.0	9	20.0	3	6.7	9	20.0	1	2.2

¹Of all 45 respondents.

Lead Toxicity (child). Of the 45 agencies responding, 43 (95.6%) reported collecting data on lead toxicity in children, and 40 (88.9%) stated that the condition is legally reportable within their jurisdictions. Of all health effects of interest, lead poisoning in children is legally reportable in the most jurisdictions, and data are collected by the most agencies. Most (77.8%) reported that they receive case reports from 1–3 sources; the most common sources are laboratories (95.6%) and physicians (71.1%). Of the 43 agencies that collect data on childhood lead toxicity, more agencies reported summarizing and releasing information about case reports (74.4%) to the public than investigations (30.2%). Most agencies (76.7%) have 2–3 procedures for follow-up of case reports, such as exposure investigations (86.0%) and case-patient interviews (72.1%). In 30/43 (69.8%) agencies, >100 cases are reported annually. An average of 35.3% of reported cases trigger investigation each year, and 10/43 (23.3%) respondents reported that 50%–100% of reported cases trigger investigation by environmental health program staff.

Lead Toxicity (adult). Forty-one (91.1%) of 45 responding agencies reported collecting data on adult lead poisoning, which is reportable in 37/45 (82.2%) of these jurisdictions. After childhood lead toxicity, adult lead toxicity is the most common condition investigated by and legally reportable among agencies assessed. Laboratory and physician reporting were the most common sources of case reports, and case-patient interviews and exposure investigations were the most common procedures available for follow-up. Of the agencies that reported having an alternative procedure for follow-up, 8 report adult lead poisoning cases to the Occupational Safety and Health Administration (OSHA). Twenty-five (61.0%) of the 41 agencies that collect data on adult lead poisoning release case report data to the public; investigation information was reported by only 7/41 (17.1%). Twenty-one (51.2%) of these 41 agencies reported receiving >100 case reports annually; an average of 10.9% of case reports trigger investigations. For adult lead toxicity, only 2/41 (4.9%) agencies reported that more than half of all cases trigger investigations.

Table 5. Procedures for Follow-up of Individual Case Reports¹

Condition	Case-patient interview		Medical record review		Exposure investigation		Other	
	No.	%	No.	%	No.	%	No.	%
Lead toxicity (child)	31	72.1	17	39.5	37	86.0	13	30.2
Lead toxicity (adult)	24	58.5	11	26.8	18	43.9	18	43.9
Mercury toxicity	19	76.0	9	36.0	16	64.0	6	24.0
Arsenic toxicity	17	77.3	9	40.9	14	63.6	5	22.7
Cadmium toxicity	12	66.7	5	27.8	9	50.0	8	44.4
Acute pesticide illness/injury	23	76.7	15	50.0	16	53.3	7	23.3
Acute respiratory disease from chemical exposures	15	75.0	11	55.0	12	60.0	3	15.0
Acute disease cluster from environmental exposures	19	70.4	14	51.9	18	66.7	3	11.1
Methemoglobinemia	7	70.0	6	60.0	6	60.0	1	10.0
Carbon monoxide poisoning	9	39.1	8	34.8	8	34.8	7	30.4
Hyperthermia (morbidity/mortality)	1	6.7	2	13.3	1	6.7	1	6.7

¹Of respondents reporting that data are collected on the condition of interest (Table 3).

Table 6. Estimated Number of Cases Reported Annually that Meet Case Definition or Are Considered a Case by Agency and Percent that Trigger Investigation¹

Condition	Estimated number of cases												Average % of cases triggering investigation
	1–10		11–50		51–100		101–1,000		>1,000		Missing		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Lead toxicity (child)	2	4.7	8	18.6	3	7.0	13	30.2	17	39.5	0	0.0	35.3
Lead toxicity (adult)	5	12.2	7	17.1	6	14.6	13	31.7	8	19.5	2	4.9	10.9
Mercury toxicity	13	52.0	5	20.0	1	4.0	1	4.0	1	4.0	4	16.0	32.3
Arsenic toxicity	8	36.4	4	18.2	2	9.1	1	4.5	0	0.0	7	31.8	40.0
Cadmium toxicity	12	66.7	0	0.0	0	0.0	0	0.0	0	0.0	6	33.3	27.3
Acute pesticide illness/injury	9	30.0	3	10.0	4	13.3	8	26.7	1	3.3	5	16.7	25.9
Acute respiratory disease from chemical exposures	6	30.0	5	25.0	2	10.0	2	10.0	0	0.0	5	25.0	25.7
Acute disease cluster from environmental exposures	14	51.9	3	11.1	3	11.1	0	0.0	1	3.7	6	22.2	58.8
Methemoglobinemia	7	70.0	0	0.0	0	0.0	0	0.0	0	0.0	3	30.0	50.1
Carbon monoxide poisoning	4	17.4	7	30.4	1	4.3	10	43.5	0	0.0	1	4.3	18.5
Hyperthermia (morbidity/mortality)	1	6.7	4	26.7	1	6.7	0	0.0	4	26.7	5	33.3	5.0

¹Of respondents reporting that data are collected on the condition of interest (Table 3).

Mercury Toxicity. Twenty-five (55.6%) of the 45 responding agencies reported collecting data on mercury toxicity. This condition is legally reportable in 21/45 (46.7%) jurisdictions, of which 5 report occupational cases only. About half of the 25 agencies that collect data on this condition summarize and report cases, and one third report investigation information annually. Most (72.0%) agencies that collect this data receive few cases (1–50) annually. On average, one third of case reports trigger investigation; 6/25 (24.0%) respondents reported that ≥50% cases resulted in a case investigation.

Arsenic Toxicity. Of responding agencies, 22/45 (48.9%) reported collecting data on arsenic toxicity. This condition is legally reportable in 18/45 (40.0%) jurisdictions, of which 2 report occupational cases only. Of the 22 agencies collecting data, 40.9% and 27.3% report case and investigation information, respectively, to the public. Few cases are reported annually; 54.5% of respondents reported receiving <50 cases annually. On average, 40.0% of case reports trigger investigation; in only 4/22 (18.2%) jurisdictions are >50% of cases investigated.

Cadmium Toxicity. Of the 45 agencies responding, 18 (40.0%) agencies reported collecting data on cadmium toxicity. It is a reportable condition in 15/45 (33.3%) jurisdictions, of which 3 report occupational cases only. Cadmium toxicity case and investigation summaries are issued to the public by only 7 and 3 agencies, respectively. Of the 18 agencies collecting data, 12 reported receiving <10 cases annually; fewer than one third of case reports trigger investigation, and only 3/18 (16.7%) agencies investigate at least 50% of reported cases.

Acute Pesticide Illness/Injury. Thirty (66.7%) of the 45 responding agencies reported collecting data on acute pesticide illness or injury. Twenty-five (55.6%) stated that the condition is legally reportable in their jurisdictions; 6 reported collecting data on occupational cases only. The most frequent source of reporting is poison control centers (55.6%). Among the 30 agencies that collect data on this condition, about half of respondents indicated that case data on acute pesticide illness/injury are reported to the public; investigation information is reported less frequently (30.0% of jurisdictions). Although case-patient interviews and exposure investigations are the most commonly reported follow-up procedures, agencies also frequently use medical record reviews for this condition (50.0%). Estimated numbers of cases vary; 30.0% of agencies reported receiving between 1–10 cases annually, and 26.7% reported 101–1,000 cases annually. On average, about one quarter of reported cases trigger investigation; 3/30 (10.0%) agencies investigate at least half of reported cases.

Acute Respiratory Disease from Chemical Exposures. Of responding agencies, 20/45 (44.4%) agencies reported collecting data on acute respiratory diseases related to chemical exposures. This condition is legally reportable in only 16/45 (35.6%) jurisdictions, of which 8 collect data on occupational cases only. Acute respiratory disease is most commonly reported to the health agencies by physicians (37.8%) and external agencies (31.1%). Among the 20 collecting data on this condition, few agencies summarize case (40.0%) or investigation (15.0%) information for the public. Case-patient interviews and exposure investigations are important follow-up procedures, but medical record reviews (55.0%) are also frequently used for this health effect. Fifty-five percent of respondents reported receiving <50 cases annually. On average, 25.7% of reported cases trigger investigation; 4/20 (20.0%) agencies investigate 50%–99% of reported cases, and 1/20 (5.0%) investigates 100% of reported cases.

Acute Disease Cluster from Environmental Exposures. Twenty-seven (60.0%) of the 45 responding agencies reported collecting data on acute disease clusters associated with environmental exposures. This condition is legally reportable in 19/45 (42.2%) jurisdictions, of which 1 collects data on occupational cases only. Phone calls from citizens were the most

commonly cited source of case reports (51.1%). Compared to other conditions, agencies that collect data on this condition summarize and report acute disease cluster investigation information most frequently (40.7% of agencies). Few cases associated with disease clusters are reported annually; 51.9% of respondents reported receiving 1–10 cases annually. However, acute disease cluster cases have the highest investigation rate; 58.8% of cases trigger investigation. Ten (37.0%) of the 27 agencies that collect data on this condition reported investigating $\geq 50\%$ of reported cases each year.

Methemoglobinemia. Of the 45 agencies responding, 10 (22.2%) agencies reported collecting data on methemoglobinemia, the lowest percentage of all health conditions of interest. This condition is legally reportable in 5/45 (11.1%) jurisdictions, of which 1 collects data on occupational cases only. Methemoglobinemia case data are reported to the public less frequently (30.0%) than any other condition. Few cases are reported annually (70.0% of agencies receive reports of 1–10 cases). However, methemoglobinemia has the second highest investigation rate; among agencies that collect data on methemoglobinemia, 50.1% of case reports trigger investigation.

Carbon Monoxide Poisoning. Of responding agencies, 23/45 (51.1%) agencies reported collecting data on carbon monoxide poisoning, which is legally reportable in 15/45 (33.3%) jurisdictions; 2 collect occupational cases only. Physicians (40.0%) and poison control centers (28.9%) were the most commonly cited reporting sources, and case-patient interviews (39.1%) were the most commonly reported follow-up procedures. Among the 23 agencies collecting carbon monoxide poisoning data, 43.5% receive 101–1,000 case reports annually, followed by another 30.4% that receive only 11–50 case reports. Half of the agencies summarize and report carbon monoxide case data to the public. On average, 18.5% of reported cases trigger investigation, and only 3/23 (13.0%) agencies investigate 50%–100% of reported cases.

Hyperthermia (morbidity/mortality). Hyperthermia is legally reportable in only 3/45 (6.7%) jurisdictions, and 15/45 (33.3%) reported collecting data on this health effect, the lowest percentage for all the conditions of interest. Legal requirements for reporting are related to occupational cases only for 2 of the 3 agencies. Review of existing health data, such as hospital discharge data, and syndromic surveillance are the most common report sources (20.0% of agencies each). Among the 15 agencies that collect data on hyperthermia, about half of agencies report case summaries to the public, and only 1 agency summarizes and reports investigation information. Few agencies reported having follow-up procedures for hyperthermia (5 of 15 collecting data). Four agencies receive $>1,000$ case reports and 4 receive 11–50 case reports annually. Only 5.0% of reported cases trigger investigation, the lowest investigation rate of all the conditions of interest.

Impact of Reporting for Environment-Related Health Conditions. By using a ranking system based on annual number of cases reported weighted by population size (see Tables 1 and 2), health conditions were categorized by the percentage of total impact or burden of environmental health-related activities and reporting for an agency (Figure 1). Lead toxicity in children accounted for 27.4% of the total impact, followed closely by adult lead toxicity (22.0%). All other health conditions of interest accounted for $\leq 10\%$ of total impact of activities from acute pesticide illness and injury (11.9%) and carbon monoxide poisoning (9.9%) to methemoglobinemia (2.0%).

Reportable Conditions: State Reportable Conditions Assessment (SRCA) vs. this Environmental Health Assessment. Next, we compared the number of conditions that respondents noted as being legally reportable in this assessment with results from the SRCA. Six health conditions

were included in both assessments: childhood and adult lead toxicity, mercury toxicity, arsenic toxicity, cadmium toxicity, and pesticide illness/injury. On average, respondents reported 4.4 (SD 1.7) reportable conditions in the SRCA and 3.5 (SD 1.9) in this assessment. Several discrepancies between the 2 assessments were noted (Table 7). Agreement between the 2 assessments was high for adult and childhood lead toxicity and acute pesticide illness or injury, with a 0.0%–6.7% difference between the assessments. Discrepancies were greater between the 2 assessments for the other heavy metals: mercury (17.8% difference), arsenic (20.0% difference), and cadmium (28.9% difference) toxicities.

Figure 1. Percentage of Total Impact of Activities and Reporting for Environment-Related Health Outcomes

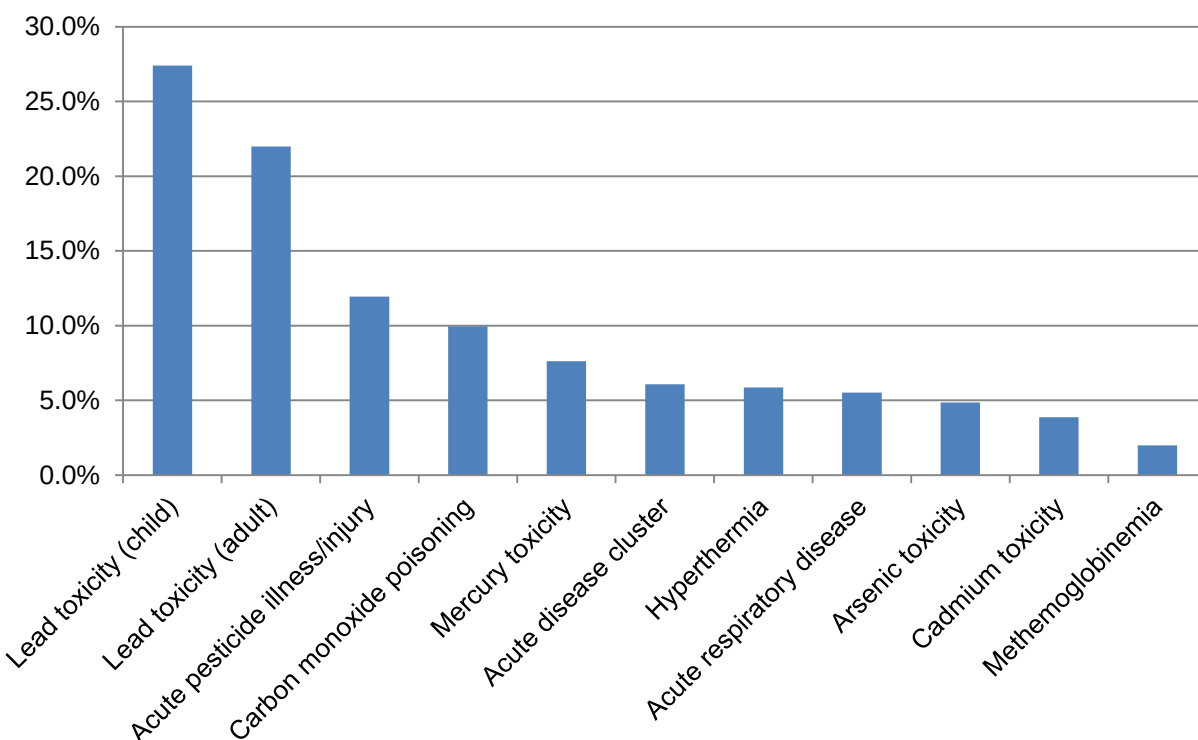


Table 7. Differences in Reportable Health Conditions between the State Reportable Conditions Assessment (SRCA) and this Environmental Health (EH) Assessment¹

Condition	SRCA		EH Assessment	
	No.	%	No.	%
Lead toxicity (child)	40	88.9	40	88.9
Lead toxicity (adult)	39	86.7	37	82.2
Mercury toxicity	29	64.4	21	46.7
Arsenic toxicity	27	60.0	18	40.0
Cadmium toxicity	28	62.2	15	33.3
Acute pesticide illness/injury	28	62.2	25	55.6

¹Of all 45 respondents.

Environmental Exposure Events

This section describes state and local jurisdictions' processes for monitoring and follow-up of environmental exposure events, including information about the reporting of such events (Table 8), sources for identification of events (Table 9), and procedures for follow-up (Table 10). Unless otherwise noted, the most common sources for identifying exposure events were phone calls from citizens or referrals from external agencies, and the most common procedures for follow-up were referrals to the appropriate regulatory agency and technical assistance or telephone consultation. Also provided are estimates of the total number of events and the proportion of events that trigger investigation annually (Table 11). For a full summary with detailed response counts for each question on each exposure event individually, see Appendix C.

Mold. Thirty-four (75.6%) of the 45 responding agencies reported collecting information about mold exposure events; 23 (67.6%) of these 34 agencies also included occupational exposure events. In addition to citizen phone calls and external agency referrals, calls from local health departments (62.2%) were frequent report sources for mold events. Among the 34 agencies collecting data on mold events, technical assistance was most frequently provided for mold-related exposures (30 [88.2%] agencies). Over half (18 [52.9%]) of these 34 agencies receive 101–1,000 event reports annually. Just under half (47.2%) of reported events trigger follow-up actions, and 11/34 (32.4%) respondents take action on ≥50% of reported events.

Table 8. Reporting of Environmental Exposure Events

Event	Agency collects data ¹		Includes occupational exposure events ²		Event data summarized & reported ²	
	No.	%	No.	%	No.	%
Mold	34	75.6	23	67.6	3	8.8
Radiation releases/exposures	31	68.9	28	90.3	7	22.6
Chemically contaminated products	26	57.8	12	46.2	6	23.1
Chemically contaminated food	33	73.3	14	42.4	8	24.2
Chemically contaminated water	36	80.0	14	38.9	14	38.9
Mercury spills	30	66.7	23	76.7	7	23.3
Carbon monoxide releases	17	37.8	11	64.7	7	41.2
Pesticide misapplications/ accidental exposures	18	40.0	11	61.1	5	27.8
Other chemical spills/releases	23	51.1	15	65.2	9	39.1

¹Of all 45 respondents.

²Of respondents reporting that data are collected on the condition of interest.

Radiation Releases/Exposures. Of the 45 responding agencies, 31 (68.9%) agencies reported collecting information about radiation releases, and 28/31 (90.3%) also reported collecting information about occupational exposures. Receipt of information about exposures from stories in the media was most commonly associated with radiation releases (18 [40.0%] of 45 responding agencies). Among the 31 agencies that collect data on radiation releases/exposures, site visits and technical assistance or telephone consultations (71.0% of agencies each) were the most common event follow-up procedures reported. Few events are reported annually; most respondents (61.3%) receive reports of <10 events each year. Of

reported events, 65.2% trigger follow-up, and 15/31 (48.4%) agencies investigate at least 50% of reported radiation release events.

Chemically Contaminated Products. Of responding agencies, 26/45 (57.8%) agencies reported collecting information about chemically contaminated products, but only 12/26 (46.2%) collect information about occupational exposures. Chemically contaminated product events are rare; 69.2% of agencies receive reports of <10 events annually. On average, 55.8% of reports lead to follow-up actions, and 9/26 (34.6%) agencies follow up on at least 50% of reported events.

Chemically Contaminated Food. Thirty-three (73.3%) of the 45 responding agencies reported collecting data, on chemically contaminated food, of which 14/33 (42.4%) also collect information about occupational exposures. Contaminated food is associated with the most follow-up procedures; >65% of responding agencies reported the following procedures: confirming event, epidemiology investigation, local health department referrals, regulatory agency referrals, technical assistance, and site visits. Among jurisdictions that collect data on this exposure event, fewer than 10 chemically contaminated food events are reported annually in most (72.7%) jurisdictions, but almost 80% of such reports lead to follow-up actions. Nineteen (57.6%) of 33 agencies take action on 50%–100% of reported events.

Chemically Contaminated Water. More agencies collect data on chemically contaminated water events than on any other environmental exposure (36 [80.0%] of 45 responding agencies). Receipt of information about exposures from local health departments was more often associated with chemically contaminated water events (30/45 [66.7%] agencies). Of the 36 agencies collecting data, 14 (38.9%) agencies also reported collecting data on occupational exposures to chemically contaminated water. This type of event was the most frequently reported to the public (14/36 [38.9%] agencies). Fifty-five percent of respondents receive >10 event reports annually. More frequently than reports of any other exposure events, reports of chemically contaminated water events lead to follow-up actions by the agency (81.6%, on average); 20/36 (55.6%) agencies investigate 100% of reported events.

Mercury Spills. Thirty (66.7%) of 45 responding agencies reported collecting data on mercury spills; 23/30 (76.7%) also collect occupational exposure data. Mercury spill events are rare; 66.7% of agencies reported <10 events annually. Three quarters of event reports trigger follow-up investigation or action on average, and 16/30 (53.3%) agencies investigate 100% of reported mercury spills.

Carbon Monoxide Releases. Of the 45 responding agencies, 17 (37.8%) agencies reported collecting data about carbon monoxide releases; 11/17 (64.7%) also collect information about occupational exposures. Of agencies that collect data, 11/17 (64.7%) agencies receive reports of 1–50 events annually; an average of only 43.2% reports trigger follow-up actions, and 5/17 (29.4%) agencies act on 100% of reported events.

Pesticide Misapplications/Accidental Exposures. Of responding agencies, 18/45 (40.0%) agencies reported collecting information about pesticide misapplications or accidental exposures; 11/18 (61.1%) agencies also collect occupational exposure data. Such events are rare among respondents; 55.6% receive reports of <10 events annually; 60.4% of reports trigger a response by health agencies, and 8/18 (44.4%) agencies follow-up on ≥50% events.

Other Chemical Releases/Spills. Other chemical spills or releases were reported by 23 (51.1%) of the 45 responding agencies, of which 15/23 (65.2%) also include occupational exposure events. In addition to receiving referrals from external agencies (46.7% of agencies), calls from

Table 9. Sources for Identification of Environmental Exposure Events

Event	Phone call from citizen		External agency referral		Stories in the media		Call from local health		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%
Mold	34	75.6	27	60.0	8	17.8	28	62.2	3	6.7
Radiation releases/exposures	22	48.9	25	55.6	18	40.0	15	33.3	17	37.8
Chemically contaminated products	21	46.7	20	44.4	7	15.6	20	44.4	6	13.3
Chemically contaminated food	31	68.9	31	68.9	15	33.3	26	57.8	6	13.3
Chemically contaminated water	32	71.1	33	73.3	15	33.3	30	66.7	7	15.6
Mercury spills	28	62.2	28	62.2	6	13.3	23	51.1	4	8.9
Carbon monoxide releases	16	35.6	16	35.6	5	11.1	13	28.9	3	6.7
Pesticide misapplications/ accidental exposures	16	35.6	17	37.8	6	13.3	13	28.9	7	15.6
Other chemical spills/releases	17	37.8	21	46.7	11	24.4	19	42.2	5	11.1

¹Of all 45 respondents.

Table 10. Procedures for Follow-up of Environmental Exposure Events¹

Event	Confirming event		Epi investigation		Local health referral		Regulatory agency referral		Technical assistance		Site visit		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mold	9	26.5	5	14.7	10	29.4	15	44.1	30	88.2	12	35.3	6	17.6
Radiation releases/exposures	19	61.3	9	29.0	6	19.4	16	51.6	22	71.0	22	71.0	7	22.6
Chemically contaminated products	13	50.0	10	38.5	9	34.6	18	69.2	20	76.9	11	42.3	2	7.7
Chemically contaminated food	23	69.7	24	72.7	22	66.7	26	78.8	22	66.7	23	69.7	1	3.0
Chemically contaminated water	22	61.1	14	38.9	16	44.4	24	66.7	25	69.4	22	61.1	2	5.6
Mercury spills	13	43.3	7	23.3	11	36.7	19	63.3	25	83.3	18	60.0	3	10.0
Carbon monoxide releases	7	41.2	6	35.3	8	47.1	10	58.8	12	70.6	8	47.1	0	0.0
Pesticide misapplications/ accidental exposures	7	38.9	5	27.8	9	50.0	15	83.3	14	77.8	8	44.4	3	16.7
Other chemical spills/releases	13	56.5	8	34.8	14	60.9	17	73.9	18	78.3	9	39.1	4	17.4

¹Of respondents reporting that data are collected on the condition of interest (Table 8).

Table 11. Estimated Number of Environmental Exposure Events Reported Annually and Triggering Follow-up¹

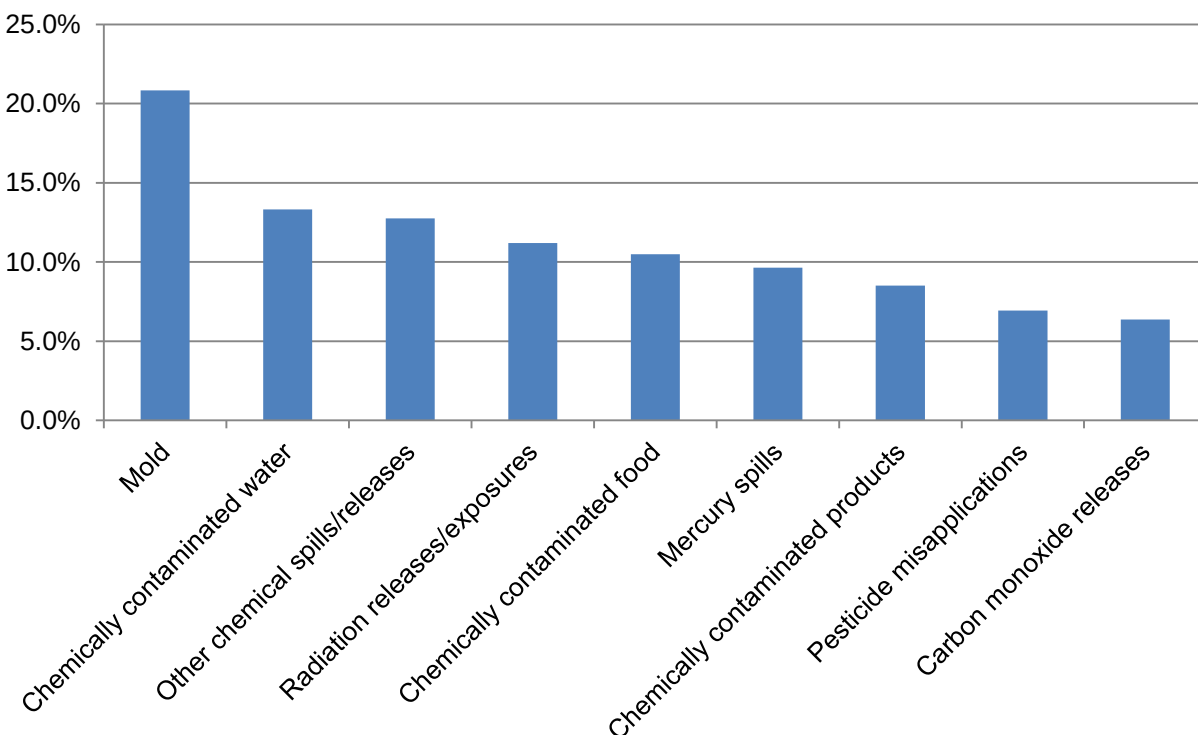
Event	Estimated number of events												Average % of events triggering follow-up actions
	1–10		11–50		51–100		101–1,000		>1,000		Missing		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Mold	2	5.9	4	11.8	5	14.7	18	52.9	3	8.8	2	5.9	47.2
Radiation releases/exposures	19	61.3	3	9.7	0	0.0	3	9.7	0	0.0	6	19.4	65.2
Chemically contaminated products	18	69.2	2	7.7	0	0.0	1	3.8	0	0.0	5	19.2	55.8
Chemically contaminated food	24	72.7	4	12.1	0	0.0	1	3.0	0	0.0	4	12.1	79.4
Chemically contaminated water	16	44.4	5	13.9	3	8.3	2	5.6	2	5.6	8	22.2	81.6
Mercury spills	20	66.7	8	26.7	0	0.0	0	0.0	0	0.0	2	6.7	74.8
Carbon monoxide releases	6	35.3	5	29.4	1	5.9	3	17.6	0	0.0	2	11.8	43.2
Pesticide misapplications/ accidental exposures	10	55.6	2	11.1	1	5.6	2	11.1	0	0.0	3	16.7	60.4
Other chemical spills/releases	10	43.5	2	8.7	1	4.3	6	26.1	2	8.7	2	8.7	41.7

¹Of respondents reporting that data are collected on the condition of interest (Table 8).

local health centers (42.2%) were the most frequently cited sources for identification of other chemical spill events. Among the 23 agencies who collect data on other chemical releases/spills, 10 (43.5%) agencies reported receiving <10 exposure event reports annually. Only an average of 41.7% of reports yield public health action, and 7/23 (30.4%) agencies follow up on 50%–100% of events.

Impact of Reporting for Environmental Exposure Events. Using a ranking system based on annual number of events reported weighted by population size (see Tables 1 and 2), environmental exposure events were categorized by the percentage of total impact or burden of environmental health-related activities and reporting for an agency (Figure 2). Mold-related events accounted for 20.8% of the total impact, followed by chemically contaminated water events (13.3%), other chemical spills or releases (12.7%), radiation releases/exposures (11.2%) and chemically contaminated food events (10.5%). All other exposure events of interest accounted for ≤10% of total impact of activities and reporting.

Figure 2. Percentage of Total Impact of Activities and Reporting for Environmental Exposure Events



Syndromic Surveillance as a Tool for Environmental Monitoring and Response

Among all 45 respondents, 24 (53.3%) did not report using syndromic surveillance for any of the 11 health effects of interest. Ten (22.2%) reported using this tool for 1 health effect, and 11 (24.4%) reported using it for 2–10 health effects, for a total of 21 (46.7%) respondents using syndromic surveillance for environmental monitoring and response. There was no difference in the number of legally reportable conditions or environmental exposure events monitored by use of syndromic surveillance. Furthermore, the total number of cases reported annually did not differ notably between agencies that use and do not use syndromic surveillance.

Effect of Radiation Control Agency Location on Radiation Exposure Event Reporting and Activities

We compared the location of the radiation control agency by reporting and activities related to radiation release events for 44 of the 45 respondents due to availability of information (Table 12). Several statistically significant differences were noted. In 25/44 (56.8%) jurisdictions, the radiation control agency is located within the health department; in 19/44 (43.2%) jurisdictions, it is external to the health department. For jurisdictions in which the radiation control agency is within the health department, agencies reported more reporting sources for identifying events (3.0 vs. 1.1; $p<0.01$) and were more likely to report receiving information from all sources (all $p<0.02$), with the exception that reports from local health agencies were received by both types of radiation control agencies (within and not within the health department). In addition, jurisdictions with radiation control agencies within the health department were more likely to collect data on radiation events (92.0% vs. 42.1%; $p<0.01$), and were also more likely to conduct site visits for follow-up ($p<0.03$).

Table 12. Location of Radiation Agency by Radiation Event Reporting and Activities (N = 44)

Table 11: Location of Radiation Agency by Radiation Event Reporting and Activities (N = 11)						
Variable	Category	Location of radiation control agency				Chi-square p value
		Health dept. (n = 25)		Other dept. (n = 19)		
		No.	%	No.	%	
Sources for identifying events ¹	Phone call from citizen	17	68.0	5	26.3	0.0062
	Referral from another agency	20	80.0	5	26.3	0.0004
	Stories in the media	14	56.0	4	21.1	0.0195
	Call from local health	11	44.0	4	21.1	0.1117
	Other	14	56.0	3	15.8	0.0067
	Does not collect data	2	8.0	11	57.9	0.0003
	Total sources: mean (SD)	3.0	(1.6)	1.1	(1.6)	0.0002*
	Total sources: median (range)	3.0	(0–5)	0.0	(0–4)	–
Estimated number of events annually ²	1-100 cases	17	73.9	5	62.5	0.0076**
	101-1,000 cases	2	8.7	1	12.5	
	>1,000 cases	0	0.0	0	0.0	
	Missing	4	17.4	2	25.0	
Do these include occupational exposure events? ²	Yes	20	87.0	8	100.0	0.5497**
	No	0	0.0	0	0.0	
	Don't know/Not applicable	0	0.0	0	0.0	
	Missing	3	13.0	0	0.0	
Procedures for follow-up ²	Confirming event	16	69.6	3	37.5	0.2055**
	Epi investigation	6	26.1	3	37.5	0.6595**
	Referral to local health	4	17.4	2	25.0	0.6344**
	Referral to regulatory agency	10	43.5	6	75.0	0.2200**
	Technical assistance/consultation	18	78.3	4	50.0	0.1845**
	Site visit	19	82.6	3	37.5	0.0272**
	Other	5	21.7	2	25.0	1.0000**
	Missing	1	4.3	1	12.5	0.4559**
	Total procedures: mean (SD)	3.1	(1.9)	1.2	(2.0)	0.5125*
	Total procedures: median (range)	3.0	(0–6)	0.0	(0–6)	–
Are data on this type of environmental exposure event summarized and made public? ²	Yes	4	17.4	3	37.5	0.6579**
	No	13	56.5	4	50.0	
	Don't know	1	4.3	0	0.0	
	Missing	5	21.7	1	12.5	

* Pooled *t* test p value. ** Fisher exact test p value. ¹Of all respondents. ²Of respondents reporting data are collected on condition.

Resources and Barriers to Monitoring and Response

Funding. Of the 45 respondents, 19 (42.2%) reported receiving EPHT funding, and 22 (48.9%) receive support from NIOSH. We examined the effect that funding status by source had on number and types of reportable conditions and percentage of health conditions or exposure events triggering investigations or follow-up actions.

Funding status had no significant effect on the number of reportable conditions in each jurisdiction from the SRCA or this assessment (all $p > 0.05$). Furthermore, EPHT funding had no effect on the types of reportable conditions noted in this assessment (all $p > 0.05$). For example, the proportion of jurisdictions where childhood and adult lead toxicity are reportable did not differ by EPHT funding status. However, a few differences were noted based on NIOSH funding. Jurisdictions receiving NIOSH support were significantly ($p < 0.05$) more likely to have adult lead toxicity (95.5% vs. 69.6%) and pesticide illness (72.7% vs. 39.1%) as legally reportable conditions. Also, jurisdictions with NIOSH funding reported significantly more total events annually (8.7 vs. 6.9; $p = 0.03$) than did jurisdictions without NIOSH funding.

The percentage of cases or events that trigger investigations or follow-up actions differed by EPHT (Table 13) or NIOSH (Table 14) funding. Contradictory findings were noted by EPHT funding. A greater proportion of non-EPHT jurisdictions reported not conducting case investigations on reported cases of arsenic and cadmium toxicity and acute respiratory disease from chemical exposures. However, non-EPHT jurisdictions were also more likely to report investigating $\geq 50\%$ of reported cases of arsenic and cadmium toxicity. EPHT-funded jurisdictions were more likely to conduct follow-up on 1%–49% of reported cases of these 3 health conditions. These differences could be attributable to the low case counts reported for these conditions. No other differences were statistically significant (Table 13). Significant differences by NIOSH funding were found for 5 health conditions of interest: adult lead, mercury, and cadmium toxicity; acute pesticide illness/injury; and acute respiratory disease from chemical exposures. Again, non-funded states were more likely to report no follow-up on case reports of these conditions. NIOSH-funded states were consistently more likely to investigate 1%–49% of reported cases of these conditions. No other significant differences were noted (Table 14).

Table 13. Percentage of Environment-Related Health Conditions Triggering Investigation among States with Environmental Public Health Tracking (EPHT) Funding

Health Condition	EPHT funding ¹	% Triggering investigation/action				Not collected Missing		Fisher exact test p value ²
		0%	1%–49%	50%–99%	100%			
		No. (%)	No. (%)	No. (%)	No. (%)			
Lead toxicity (child)	Yes	2 (10.5)	5 (26.3)	0 (0.0)	5 (26.3)	1 (5.3)	6 (31.6)	0.5208
	No	2 (7.7)	12 (46.2)	1 (3.9)	4 (15.4)	1 (3.9)	6 (23.1)	
Lead toxicity (adult)	Yes	4 (21.1)	7 (36.8)	0 (0.0)	0 (0.0)	1 (5.3)	7 (36.8)	0.1620
	No	11 (42.3)	5 (19.2)	0 (0.0)	2 (7.7)	3 (11.5)	5 (19.2)	
Mercury toxicity	Yes	1 (5.3)	5 (26.3)	2 (10.5)	1 (5.3)	7 (36.8)	3 (15.8)	0.2034
	No	4 (15.4)	1 (3.9)	1 (3.9)	2 (7.7)	13 (50.0)	5 (19.2)	
Arsenic toxicity	Yes	1 (5.3)	4 (21.1)	0 (0.0)	0 (0.0)	8 (42.1)	6 (31.6)	0.0186
	No	4 (15.4)	0 (0.0)	1 (3.9)	3 (11.5)	15 (57.7)	3 (11.5)	
Cadmium toxicity	Yes	2 (10.5)	4 (21.1)	0 (0.0)	0 (0.0)	11 (57.9)	2 (10.5)	0.0256
	No	5 (19.2)	0 (0.0)	1 (3.9)	2 (7.7)	16 (61.5)	2 (7.7)	
Acute pesticide illness/injury	Yes	0 (0.0)	8 (42.1)	1 (5.3)	1 (5.3)	4 (21.1)	5 (26.3)	0.1463
	No	3 (11.5)	3 (11.5)	1 (3.9)	1 (3.9)	11 (42.3)	7 (26.9)	
Acute respiratory disease from chemical exposures	Yes	0 (0.0)	7 (36.8)	2 (10.5)	0 (0.0)	8 (42.1)	2 (10.5)	0.0065
	No	2 (7.7)	0 (0.0)	2 (7.7)	1 (3.9)	17 (65.4)	4 (15.4)	
Acute disease cluster from environmental exposures	Yes	2 (10.5)	3 (15.8)	1 (5.3)	2 (10.5)	6 (31.6)	5 (26.3)	0.6846
	No	1 (3.9)	2 (7.7)	3 (11.5)	4 (15.4)	12 (46.2)	4 (15.4)	
Methemoglobinemia	Yes	0 (0.0)	2 (10.5)	0 (0.0)	1 (5.3)	16 (84.2)	0 (0.0)	0.4286
	No	2 (7.7)	0 (0.0)	1 (3.9)	1 (3.9)	19 (73.1)	3 (11.5)	
Carbon monoxide poisoning	Yes	5 (26.3)	5 (26.3)	1 (5.3)	0 (0.0)	5 (26.3)	3 (15.8)	0.7075
	No	3 (11.5)	2 (7.7)	1 (3.9)	1 (3.9)	17 (65.4)	2 (7.7)	
Hyperthermia (morbidity/mortality)	Yes	2 (10.5)	2 (10.5)	0 (0.0)	0 (0.0)	10 (52.6)	5 (26.3)	1.0000
	No	0 (0.0)	1 (3.9)	0 (0.0)	0 (0.0)	20 (76.9)	5 (19.2)	

¹Percentage of those with EPHT funding (n = 19) and without EPHT funding (n = 26).

²Does not include “not collected” and “missing” groups in calculation of Fisher exact test p value.

Table 14. Percentage of Environment-Related Health Conditions Triggering Investigation among States with National Institute for Occupational Safety and Health (NIOSH) Funding

Health Condition	NIOSH funding ¹	% Triggering investigation/action				Not collected Missing		Fisher exact test p value ²
		0%	1%–49%	50%–99%	100%			
		No. (%)	No. (%)	No. (%)	No. (%)			
Lead toxicity (child)	Yes	3 (13.6)	5 (22.7)	1 (4.6)	6 (27.3)	1 (4.6)	6 (27.3)	0.1098
	No	1 (4.4)	12 (52.2)	0 (0.0)	3 (13.0)	1 (4.4)	6 (26.1)	
Lead toxicity (adult)	Yes	4 (18.2)	9 (40.9)	0 (0.0)	0 (0.0)	1 (4.6)	8 (36.4)	0.0142
	No	11 (47.8)	3 (13.0)	0 (0.0)	2 (8.7)	3 (13.0)	4 (17.4)	
Mercury toxicity	Yes	1 (4.5)	6 (27.3)	3 (13.6)	1 (4.5)	9 (40.9)	2 (9.1)	0.0076
	No	4 (17.4)	0 (0.0)	0 (0.0)	2 (8.7)	11 (47.8)	6 (26.1)	
Arsenic toxicity	Yes	1 (4.6)	4 (18.2)	1 (4.6)	1 (4.6)	10 (45.5)	5 (22.7)	0.0676
	No	4 (17.4)	0 (0.0)	0 (0.0)	2 (8.7)	13 (56.5)	4 (17.4)	
Cadmium toxicity	Yes	1 (4.6)	4 (18.2)	1 (4.6)	1 (4.6)	14 (63.6)	1 (4.5)	0.0128
	No	6 (26.1)	0 (0.0)	0 (0.0)	1 (4.4)	13 (56.5)	3 (13.0)	
Acute pesticide illness/injury	Yes	0 (0.0)	11 (50.0)	1 (4.6)	1 (4.6)	3 (13.6)	6 (27.3)	0.0011
	No	3 (13.0)	0 (0.0)	1 (4.4)	1 (4.4)	12 (52.2)	6 (26.1)	
Acute respiratory disease from chemical exposures	Yes	0 (0.0)	7 (31.8)	4 (18.2)	0 (0.0)	9 (40.9)	2 (9.1)	0.0027
	No	2 (8.7)	0 (0.0)	0 (0.0)	1 (4.4)	16 (69.6)	4 (17.4)	
Acute disease cluster from environmental exposures	Yes	2 (9.1)	3 (13.6)	3 (13.6)	2 (9.1)	8 (36.4)	4 (18.2)	0.6846
	No	1 (4.4)	2 (8.7)	1 (4.4)	4 (17.4)	10 (43.5)	5 (21.7)	
Methemoglobinemia	Yes	0 (0.0)	2 (9.1)	1 (4.6)	1 (4.6)	18 (81.8)	0 (0.0)	0.4286
	No	2 (8.7)	0 (0.0)	0 (0.0)	1 (4.4)	17 (73.9)	3 (13.0)	
Carbon monoxide poisoning	Yes	5 (22.7)	7 (31.8)	1 (4.6)	0 (0.0)	6 (27.3)	3 (13.6)	0.0735
	No	3 (13.0)	0 (0.0)	1 (4.4)	1 (4.4)	16 (69.6)	2 (8.7)	
Hyperthermia (morbidity/mortality)	Yes	2 (9.1)	3 (13.6)	0 (0.0)	0 (0.0)	13 (59.1)	4 (18.2)	1.0000
	No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	17 (73.9)	6 (26.1)	

¹Percentage of those with NIOSH funding (n = 22) and without NIOSH funding (n = 23).

²Does not include “not collected” and “missing” groups in calculation of Fisher exact test p value.

Staffing. On average, responding agencies reported having a total of 7.5 FTEs (median: 4.0; range: 0–40) devoted to environmental illness, injury, exposure, or contamination monitoring and investigation activities. This was further broken down into an average of 6.1 (median: 4.0; range: 0–36) environmental FTEs and 1.4 (median: 1.0; range: 0–11) occupational FTEs. Few differences were noted in FTEs by funding source (Table 15). Jurisdictions with EPHT funding had significantly more total FTEs devoted to environment-related activities (average: 10.9 vs. 4.5; $p = 0.03$), as well as a greater average number of environmental health FTEs (average: 9.1 vs. 3.9; $p = 0.05$), although this difference was not significant. No differences were noted by NIOSH funding.

Table 15. Full-Time Equivalent (FTE) Employees Devoted to Environment-Related Activities by Funding Source

EPHT funding					
Type of FTE	Yes		No		t test
	Mean (SD)	Median (range)	Mean (SD)	Median (range)	p value
Environmental health	9.1 (10.4)	5.5 (0.5–36.0)	3.9 (4.2)	1.8 (0.0–12.5)	0.0544
Occupational health	1.7 (2.3)	1.0 (0.0–8.0)	1.0 (2.5)	0.1 (0.0–11.3)	0.3800
Total	10.9 (11.0)	7.5 (1.0–40.0)	4.5 (5.2)	2.0 (0.0–17.5)	0.0346
NIOSH funding					
Type of FTE	Yes		No		t test
	Mean (SD)	Median (range)	Mean (SD)	Median (range)	p value
Environmental health	6.5 (8.1)	4.0 (0.5–36.0)	5.8 (7.8)	3.0 (0.0–35.0)	0.7665
Occupational health	2.0 (2.2)	1.0 (0.1–8.0)	0.8 (2.5)	0.0 (0.0–11.3)	0.1187
Total	8.3 (9.2)	5.1 (1.0–40.0)	6.6 (8.6)	2.5 (0.0–35.0)	0.5481

Other Resources. Of the 45 responding agencies, most (39 [86.7%]) respondents noted that inadequate resources to support monitoring and response to environment-related health conditions and exposure events was an important barrier within their jurisdiction (Table 16). The second most common response (22 [48.9%]) was that the condition or event is not reportable within the agency or jurisdiction so monitoring and follow-up is not done. Another common barrier noted by responding agencies (20 [44.4%]) was not having systems or procedures in place for monitoring and response.

Respondents were asked whether their agency would be interested in expanding current acute environmental exposure and health monitoring activities if necessary funds or resources were available. Most (35 [77.8%]) responded affirmatively. Agencies were also asked whether they would be willing to share information about their procedures, such as protocols and data collection instruments, with CSTE and with other jurisdictions. Twenty-six (57.8%) respondents would be willing to share their procedures; 12 (26.7%) reported having none to share.

Table 16. Barriers to Monitoring and Response of Environment-Related Health Conditions and Exposure Events

Barrier	No.	%
Inadequately trained staff	11	24.4
Inadequate resources to support activities	39	86.7
No access to data sources to identify conditions/events	10	22.2
Not reportable so not done	22	48.9
Systems/procedures not in place	20	44.4
Resistance of local health departments to respond to these types of events	10	22.2
Other	12	26.7

Discussion

This national assessment is the first formal evaluation of national acute non-infectious environmental health/event monitoring and investigation activities in state and large local health departments. The results of this assessment provide important insights into the state of environmental health monitoring and investigation as they relate to a variety of environment-related health conditions and exposure events and are useful for identifying areas where state response capacity can be built and expanded.

The many positive aspects of current environmental health monitoring and response activities are worth mentioning. Agencies collect data on a variety of health conditions—including diseases that are not legally reportable—and environmental exposure events. The most commonly reported health conditions were childhood and adult lead toxicity, and the most common exposure events were chemical contamination of water and food and mold exposures.

Also, a wide variety of reporting sources and follow-up procedures are being used nationally. For health conditions, physician and laboratory reporting and case-patient interviews and exposure investigations were the most common. For exposure events, the most common report sources were phone calls from citizens or referrals from external agencies, and the most common follow-up procedures were referrals to the appropriate regulatory agency and technical assistance or telephone consultation.

The results of this assessment also identified areas of weakness where capacity building activities or training are most needed. Discrepancies were identified between the SRCA and this assessment in the list of legally reportable health conditions, indicating that not all public health staff within a jurisdiction are aware of the list of legally reportable conditions for which their agency is responsible.

Furthermore, fewer than half of the respondents reported that case report and exposure investigation data are summarized and made publicly available. Summarizing and disseminating these data are important components of the epidemiologist's tool box as they could help the agency identify the need to refocus or redistribute funds, staff, or other resources for specific health conditions or exposure events. Data analysis can help identify trends in environment-related diseases over time. Data summaries also serve as a tool for communication with external partners, some of whom might be sources of the data or might be able to take action on reported results, either through intervention or prevention programs.

Most respondents reported not using syndromic surveillance systems for any of the 11 diseases of interest, and half of those who did report using syndromic surveillance use it for only 1 of the health conditions. Recently, an effort has been underway to expand the use of syndromic surveillance systems for environmental health conditions among certain CSTE subcommittees. For example, procedures and standard syndromic surveillance case definitions for heat-related morbidity from a few states have been shared among the Environmental Health and Climate Change subcommittees. Such collaborations could be expanded to include other non-infectious environmental health conditions.

The findings in this assessment are subject to several limitations. First, the response rate for this assessment was only 80.4%, leading to the possibility of selection bias in assessment results. Important differences could exist between responders and non-responders, but these potential differences were unable to be controlled for in this analysis. Future assessments could

benefit by requiring a minimum amount of information from all assessed agencies for adjustment purposes.

Second, this assessment was based on self-assessment of perceived environmental health monitoring and investigation, and respondents' roles varied by jurisdiction. Assessments were sent to the environmental health lead, if one was available, or to the State Epidemiologist, but respondents listed a variety of roles. Perceptions might systematically differ depending on the respondents' involvement in the environment-related activities in this assessment; therefore, the quality and accuracy of the responses most likely varied.

Third, a few questions solicited inconsistent or incomplete responses because of assessment design and skip patterns. For example, in Question 2, respondents were asked to list all report sources for the health conditions of interest and were able to check multiple boxes. One option was also "Agency does not collect data on this condition," which occasionally was marked, although other sources also were chosen. Answers were reconciled to the extent possible on the basis of other responses within the same condition or event. Additionally, agencies did not always completely answer all questions within a health condition or exposure event, even when indicating that data were collected on that disease or event. The number and frequency of missing responses were noted in tables where necessary and in the tables in the Appendices.

This assessment was also limited in scope to the environmental health activities of the 50 states, Washington DC, and the 5 largest US cities and did not include smaller cities, counties, or other local health departments. Local-level evaluation of certain monitoring and investigation activities might be important to consider in future assessments.

Despite these limitations, the results of the assessment provide the first glimpse of national non-infectious acute environmental health and exposure monitoring and investigation activities and can be useful for sharing best practices across jurisdictions and identifying areas where building environmental health capacity is needed. Future assessments can build on these results and track trends in these activities over time.

Recommendations

1. Focus on greater public dissemination of results of case reports and exposure events.
 - The act of summarizing data to make public can
 - Aid in synthesizing the information and identifying trends;
 - Reveal areas that might need more focus;
 - Provide guidance to appropriately distribute staff and resources to the areas of greatest impact or need;
 - Assist in obtaining buy-in from external agencies or partners that are important sources of report or action by sharing data; and
 - Raise awareness of the impact or burden of these events on public health and the resources currently used for these activities.
2. Develop a repository of procedures and tools used by the 35 jurisdictions that were willing to share these items, and make the repository available to all state and local health departments.
3. Provide guidance and strategies for monitoring of and response to non-reportable health conditions.
 - Although many respondents reported collecting data on non-reportable conditions, limited ability to collect data on non-reportable conditions was listed as an important barrier by most jurisdictions.
 - Cross-agency collaboration and sharing best practices is needed to balance the demand of reportable conditions against the need to understand non-reportable conditions.
4. Conduct within-agency training on current reporting requirements and practices.
 - Discrepancies were identified among respondents in what does and does not constitute a legally reportable condition.
 - Internal training is needed to address these issues because such misunderstandings might lead to underreporting or poor quality data for some health conditions.
5. Promote the use of syndromic surveillance as a source for environment-related health conditions.
 - Cross-agency collaboration for training and sharing best practices might be useful for promoting and increasing the use of syndromic surveillance systems.
6. Expand the current levels of EPHT and NIOSH funding nationally.

APPENDIX A: Assessment



Assessment of State Activities in Non-Infectious Environmental Health/Exposure Monitoring and Investigation

CSTE needs your assistance in completing an assessment about your process and experience monitoring for environmental exposures and associated acute health effects.

Many states track, respond, and/or investigate suspected health impacts associated with non-infectious environmental exposure events. Efforts in place may include detecting, collecting and responding to case reports, public inquiries, or to reports of acute exposure events. The scope and depth of states' programs in place to perform these functions have never been assessed.

CSTE, in collaboration with the National Center for Environmental Health at CDC, is asking state health departments to participate in a short assessment of the types and extent of state health department illness, injury and exposure monitoring and response to reports of acute environmental exposure events and disease/injury. The assessment hopes to gain insight into standardization of this process (e.g., response algorithms, case definitions, case investigations forms and protocols), how this information is stored and shared within a state, how it may be linked to related programs (e.g. occupational health and injury control) and the overall scope of these efforts. Definitions for elements within the scope of the assessment are provided below.

The information obtained from this CSTE assessment will be used by a CSTE Environmental Health Workgroup to identify and share activities that could reasonably be done in most state health departments, help raise awareness of environmental health issues, and build state response capacity. De-identified results will be aggregated for analysis. Individually identifiable state responses will be confidential and will not be shared with the Workgroup or any other entity without permission.

Thank you for completing this relatively brief assessment. Please contact Erin Simms (esimms@cste.org or 770-458-3811) if you have any questions. We appreciate your time and attention to this matter.

Before answering the questions, be sure to review the definitions of terms that follow.

Definitions for this assessment:

Environmentally related diseases and injuries: Acute health conditions for which the main causes involve probable or definitive environmental exposures. They include, for example: lead and other heavy metals toxicity, pesticide poisoning, carbon monoxide poisoning, methemoglobinemia, and symptoms associated with acute chemical exposures (chlorine gas exposure, for example).

Environmental exposure events: Acute exposures (confirmed or potential) to non-infectious agents or conditions in the environment. They include, for example: chemicals; radiation;

contaminated food (excluding contamination from bacteria, viruses), toxins (e.g., mushrooms, ciguatera but excludes botulinum^{*}); contaminated products; chemically contaminated pharmaceuticals; and significant alteration in the physical environment that could have potential health impacts (e.g., heat wave). Mold and other non-infectious indoor air contaminant exposure events are also included. The events may or may not result in adverse human health effects. They may include exposures with an occupational exposure component.

Notification: Any report whether solicited under disease or exposure reporting mandates, obtained through established notification mechanisms (e.g., routine forwarding of chemical spills from state environmental protection), or unsolicited (e.g. a phone call from the public, an article in the news).

Monitoring: Is used in a general sense here to mean the on-going efforts related to the detection/handling/collection of reports of non-infectious, environmentally related acute illnesses or injuries, exposures, contaminated products, or environmental spills/releases. Could also be thought of as 'tracking' but this assessment is not focused on the Environmental Public Health Tracking (EPHT) program; thus, monitoring is the term used throughout this document. Monitoring refers to established practice that is broader and less formal and prescribed than "public health surveillance", which is the systematic "on-going collection, analysis, and dissemination of health data". Public health surveillance is thus a subcategory of "monitoring" for this assessment.

Case-based: Individual records. May includes personal identifiers. May be based on mandatory disease/injury reporting requirements of health care providers or voluntarily reported.

Exposure Investigation: Follow-up to report(s) of disease or an environmental exposure event to collect information to determine what actions need to be initiated to prevent further public health impacts. Follow-up can include epidemiologic follow-up (identifying and characterizing others potentially linked to the same exposure) and/or evaluation of the exposure event (e.g., taking measurements of mercury vapor at the site of a mercury spill, collection and testing of contaminated product.) These activities may be carried out by the state health agency or may be referred to another agency (e.g., a local health department, the state environmental agency, state or federal OSHA) for further assessment and appropriate intervention.

^{*}Botulinum is the only toxin excluded from this list. It is excluded because it is almost always handled by communicable disease programs.



1. Please provide information about the respondent below:

Name of respondent:
Title/Position at Agency:
Agency:
Program within agency:
Email:

2. For each of the following health conditions, please answer A-H as appropriate. Check all that apply for sections B and E where relevant. If selecting "Agency does not collect data on this condition" for Part B for a health condition, please answer only parts A-B for that condition.

Please base your responses on numbers from the past year:

Lead toxicity - child									
A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ No ☐ Don't know									
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) <table border="0"><tr><td>☐ Physician reporting</td><td>☐ Referral from another agency</td></tr><tr><td>☐ Lab reporting</td><td>☐ Review of existing health data (e.g. hospital discharge data)</td></tr><tr><td>☐ Report from poison control</td><td>☐ Phone call from citizen</td></tr><tr><td>☐ Syndromic surveillance</td><td>☐ Agency does not collect data on this condition (move on to next condition)</td></tr></table>		☐ Physician reporting	☐ Referral from another agency	☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)	☐ Report from poison control	☐ Phone call from citizen	☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)
☐ Physician reporting	☐ Referral from another agency								
☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)								
☐ Report from poison control	☐ Phone call from citizen								
☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)								
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000									
D. What procedures are in place for following up on individual case reports? (Check all that apply): <table border="0"><tr><td>☐ Case interview</td><td>☐ Other</td></tr><tr><td>☐ Case confirmation by medical records review</td><td>Specify other: _____</td></tr><tr><td>☐ Exposure investigation</td><td>☐ Not applicable – agency does not receive case reports</td></tr></table>		☐ Case interview	☐ Other	☐ Case confirmation by medical records review	Specify other: _____	☐ Exposure investigation	☐ Not applicable – agency does not receive case reports		
☐ Case interview	☐ Other								
☐ Case confirmation by medical records review	Specify other: _____								
☐ Exposure investigation	☐ Not applicable – agency does not receive case reports								
E. Percent of case reports triggering an exposure investigation annually: ____									
F. Are case data summarized and made public? (Check one) ☐ Yes									



☐ No
☐ Don't know

G. Are exposure investigation results summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

Lead toxicity - Adult

A. Is condition legally reportable to public health agency? (Check one)

☐ Yes
☐ No
☐ Don't know

B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply)

☐ Physician reporting	☐ Referral from another agency
☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)
☐ Report from poison control	☐ Phone call from citizen
☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)

C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency:

☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

D. What procedures are in place for following up on individual case reports? (Check all that apply):

☐ Case interview	☐ Other
☐ Case confirmation by medical records review	Specify other: _____
☐ Exposure investigation	☐ Not applicable – agency does not receive case reports

F. Percent of case reports triggering an exposure investigation annually: ____

G. Are case data summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

H. Are exposure investigation results summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

Mercury toxicity



A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know									
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) <table border="0"><tr><td>☐ Physician reporting</td><td>☐ Referral from another agency</td></tr><tr><td>☐ Lab reporting</td><td>☐ Review of existing health data (e.g. hospital discharge data)</td></tr><tr><td>☐ Report from poison control</td><td>☐ Phone call from citizen</td></tr><tr><td>☐ Syndromic surveillance</td><td>☐ Agency does not collect data on this condition (move on to next condition)</td></tr></table>		☐ Physician reporting	☐ Referral from another agency	☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)	☐ Report from poison control	☐ Phone call from citizen	☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)
☐ Physician reporting	☐ Referral from another agency								
☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)								
☐ Report from poison control	☐ Phone call from citizen								
☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)								
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000									
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know									
E. What procedures are in place for following up on individual case reports? (Check all that apply): <table border="0"><tr><td>☐ Case interview</td><td>☐ Other</td></tr><tr><td>☐ Case confirmation by medical records review</td><td>Specify other: _____</td></tr><tr><td>☐ Exposure investigation</td><td>☐ Not applicable – agency does not receive case reports</td></tr></table>		☐ Case interview	☐ Other	☐ Case confirmation by medical records review	Specify other: _____	☐ Exposure investigation	☐ Not applicable – agency does not receive case reports		
☐ Case interview	☐ Other								
☐ Case confirmation by medical records review	Specify other: _____								
☐ Exposure investigation	☐ Not applicable – agency does not receive case reports								
F. Percent of case reports triggering an exposure investigation annually: ____									
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know									
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know									

Arsenic toxicity

A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only
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☐ No ☐ Don't know	
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) ☐ Physician reporting ☐ Lab reporting ☐ Report from poison control ☐ Syndromic surveillance ☐ Referral from another agency ☐ Review of existing health data(e.g. hospital discharge data) ☐ Phone call from citizen ☐ Agency does not collect data on this condition (move on to next condition)	
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know	
E. What procedures are in place for following up on individual case reports? (Check all that apply): ☐ Case interview ☐ Case confirmation by medical records review ☐ Exposure investigation ☐ Other Specify other: _____ ☐ Not applicable – agency does not receive case reports	
F. Percent of case reports triggering an exposure investigation annually: ____	
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Cadmium toxicity	
A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know	
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that	



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apply)

☐ Physician reporting

☐ Lab reporting

☐ Report from poison control

☐ Syndromic surveillance

☐ Referral from another agency

☐ Review of existing health data (e.g. hospital discharge data)

☐ Phone call from citizen

☐ Agency does not collect data on this condition (move on to next condition)

C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency:

☐ 1-10

☐ 11-50

☐ 51-100

☐ 101-1000

☐ >1000

D. Do these include occupational cases? (Check one)

☐ Yes

☐ No

☐ Don't know

E. What procedures are in place for following up on individual case reports? (Check all that apply):

☐ Case interview

☐ Case confirmation by medical records review

☐ Exposure investigation

☐ Other

Specify other: _____

☐ Not applicable – agency does not receive case reports

F. Percent of case reports triggering an exposure investigation annually: ____

G. Are case data summarized and made public? (Check one)

☐ Yes

☐ No

☐ Don't know

H. Are exposure investigation results summarized and made public? (Check one)

☐ Yes

☐ No

☐ Don't know

Acute pesticide illness/injury

A. Is condition legally reportable to public health agency? (Check one)

☐ Yes

☐ Yes – occupational only

☐ No

☐ Don't know

B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply)

☐ Physician reporting

☐ Lab reporting

☐ Referral from another agency

☐ Review of existing health data (e.g., hospital



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☐ Report from poison control ☐ Syndromic surveillance	discharge data) ☐ Phone call from citizen ☐ Agency does not collect data on this condition (move on to next condition)
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know	
E. What procedures are in place for following up on individual case reports? (Check all that apply): ☐ Case interview ☐ Case confirmation by medical records review ☐ Exposure investigation ☐ Other Specify other: _____ ☐ Not applicable – agency does not receive case reports	
F. Percent of case reports triggering an exposure investigation annually: ____	
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Acute respiratory disease related to chemical exposure (e.g., chemical pneumonitis, acute asthma exacerbation)
A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) ☐ Physician reporting ☐ Lab reporting ☐ Referral from another agency ☐ Review of existing health data (e.g. hospital discharge data)



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☐ Report from poison control	☐ Phone call from citizen						
☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)						
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000							
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know							
E. What procedures are in place for following up on individual case reports? (Check all that apply): <table border="0"> <tr> <td>☐ Case interview</td> <td>☐ Other</td> </tr> <tr> <td>☐ Case confirmation by medical records review</td> <td>Specify other: _____</td> </tr> <tr> <td>☐ Exposure investigation</td> <td>☐ Not applicable – agency does not receive case reports</td> </tr> </table>		☐ Case interview	☐ Other	☐ Case confirmation by medical records review	Specify other: _____	☐ Exposure investigation	☐ Not applicable – agency does not receive case reports
☐ Case interview	☐ Other						
☐ Case confirmation by medical records review	Specify other: _____						
☐ Exposure investigation	☐ Not applicable – agency does not receive case reports						
F. Percent of case reports triggering an exposure investigation annually: ____							
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know							
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know							

Acute disease cluster possibly linked to an environmental exposure (excluding chronic diseases like cancer)							
A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know							
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) <table border="0"> <tr> <td>☐ Physician reporting</td> <td>☐ Referral from another agency</td> </tr> <tr> <td>☐ Lab reporting</td> <td>☐ Review of existing health data (e.g. hospital discharge data)</td> </tr> <tr> <td>☐ Report from poison control</td> <td>☐ Phone call from citizen</td> </tr> </table>		☐ Physician reporting	☐ Referral from another agency	☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)	☐ Report from poison control	☐ Phone call from citizen
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☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)						
☐ Report from poison control	☐ Phone call from citizen						



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☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know	
E. What procedures are in place for following up on individual case reports? (Check all that apply): ☐ Case interview ☐ Case confirmation by medical records review ☐ Exposure investigation ☐ Other Specify other: _____ ☐ Not applicable – agency does not receive case reports	
F. Percent of case reports triggering an exposure investigation annually: ____	
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Methemoglobinemia

A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know	
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) ☐ Physician reporting ☐ Lab reporting ☐ Report from poison control ☐ Syndromic surveillance ☐ Referral from another agency ☐ Review of existing health data (e.g. hospital discharge data) ☐ Phone call from citizen ☐ Agency does not collect data on this condition (move on to next condition)	
C. Estimated # of cases annually that either meet a case definition or are in	

some way considered a case by your agency:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

D. Do these include occupational cases? (Check one)

- ☐ Yes
☐ No
☐ Don't know

E. What procedures are in place for following up on individual case reports? (Check all that apply):

- | | |
|--|--|
| ☐ Case interview | ☐ Other _____ |
| ☐ Case confirmation by medical records review | ☐ Specify other: _____ |
| ☐ Exposure investigation | ☐ Not applicable – agency does not receive case reports |

F. Percent of case reports triggering an exposure investigation annually: ____

G. Are case data summarized and made public? (Check one)

- ☐ Yes
☐ No
☐ Don't know

H. Are exposure investigation results summarized and made public? (Check one)

- ☐ Yes
☐ No
☐ Don't know

Carbon monoxide poisoning

A. Is condition legally reportable to public health agency? (Check one)

- ☐ Yes
☐ Yes – occupational only
☐ No
☐ Don't know

B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply)

- | | |
|---|---|
| ☐ Physician reporting | ☐ Referral from another agency |
| ☐ Lab reporting | ☐ Review of existing health data (e.g. hospital discharge data) |
| ☐ Report from poison control | ☐ Phone call from citizen |
| ☐ Syndromic surveillance | ☐ Agency does not collect data on this condition (move on to next condition) |

C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency:

- ☐ 1-10
☐ 11-50



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☐ 51-100
☐ 101-1000
☐ >1000

D. Do these include occupational cases? (Check one)

☐ Yes
☐ No
☐ Don't know

E. What procedures are in place for following up on individual case reports? (Check all that apply):

☐ Case interview
☐ Case confirmation by medical records review
☐ Exposure investigation
☐ Other
Specify other: _____
☐ Not applicable – agency does not receive case reports

F. Percent of case reports triggering an exposure investigation annually: ____

G. Are case data summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

H. Are exposure investigation results summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

Hyperthermia (morbidity/mortality)

A. Is condition legally reportable to public health agency? (Check one)

☐ Yes
☐ Yes – occupational only
☐ No
☐ Don't know

B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply)

☐ Physician reporting
☐ Lab reporting
☐ Report from poison control
☐ Syndromic surveillance
☐ Referral from another agency
☐ Review of existing health data (e.g. hospital discharge data)
☐ Phone call from citizen
☐ Agency does not collect data on this condition (move on to next condition)

C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency:

☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000



D. Do these include occupational cases? (Check one)

☐ Yes
☐ No
☐ Don't know

E. What procedures are in place for following up on individual case reports? (Check all that apply):

☐ Case interview	☐ Other
☐ Case confirmation by medical records review	Specify other: _____
☐ Exposure investigation	☐ Not applicable – agency does not receive case reports

F. Percent of case reports triggering an exposure investigation annually: ____

G. Are case data summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

H. Are exposure investigation results summarized and made public? (Check one)

☐ Yes
☐ No
☐ Don't know

Other #1 (Please specify other condition: _____)

A. Is condition legally reportable to public health agency? (Check one)

☐ Yes
☐ Yes – occupational only
☐ No
☐ Don't know

B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply)

☐ Physician reporting	☐ Referral from another agency
☐ Lab reporting	☐ Review of existing health data (e.g. hospital discharge data)
☐ Report from poison control	☐ Phone call from citizen
☐ Syndromic surveillance	☐ Agency does not collect data on this condition (move on to next condition)

C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency:

☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

D. Do these include occupational cases? (Check one)

☐ Yes



☐ No ☐ Don't know	
E. What procedures are in place for following up on individual case reports? (Check all that apply): ☐ Case interview ☐ Case confirmation by medical records review ☐ Exposure investigation ☐ Other Specify other: _____ ☐ Not applicable – agency does not receive case reports	
F. Percent of case reports triggering an exposure investigation annually: ____	
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	
Other #2 (Please specify other condition: _____)	
A. Is condition legally reportable to public health agency? (Check one) ☐ Yes ☐ Yes – occupational only ☐ No ☐ Don't know	
B. Source(s) for identifying individuals and/or case counts with condition: (Check all that apply) ☐ Physician reporting ☐ Lab reporting ☐ Report from poison control ☐ Syndromic surveillance ☐ Referral from another agency ☐ Review of existing health data (e.g. hospital discharge data) ☐ Phone call from citizen ☐ Agency does not collect data on this condition (move on to next condition)	
C. Estimated # of cases annually that either meet a case definition or are in some way considered a case by your agency: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
D. Do these include occupational cases? (Check one) ☐ Yes ☐ No ☐ Don't know	
E. What procedures are in place for following up on individual case reports? (Check all that	

apply): ☐ Case interview ☐ Case confirmation by medical records review ☐ Exposure investigation		☐ Other Specify other: _____ ☐ Not applicable – agency does not receive case reports
F. Percent of case reports triggering an exposure investigation annually: ____		
G. Are case data summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know		
H. Are exposure investigation results summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know		

3. Provide brief description and/or URL links to materials that show the types of activities in your agency related to follow-up to reports of environmentally related health conditions. (e.g., Surveillance summaries, exposure investigation reports)

4. Indicate in the tables below the types of non-infectious environmental exposure events that are monitored in your agency and some their features in A-F. Check all that apply for sections A-D where relevant. If selecting "agency does not monitor this type of environmental exposure event" for A, go to the next table (i.e. do not answer parts B-F for that exposure event). (Note: Do not include events identified by disease reports, as enumerated above.)

Mold
A. Source(s) for identifying events: (Check all that apply) ☐ Phone call from citizen ☐ Referral from another agency ☐ Stories in the media ☐ Call from local health ☐ Other ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)
B. Estimated number of events annually: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000
C. Includes occupational exposure events? ☐ Yes ☐ No ☐ Don't know



D. What procedures for following up to identified events are in place? (Check all that apply):

- | | |
|--|---|
| ☐ Confirming event | ☐ Site visit/environmental exposure |
| ☐ Epi Investigation | ☐ Agency does not follow up on this type of environmental exposure event |
| ☐ Referral to local health | ☐ Other |
| ☐ Referral to regulatory agency | Specify other: _____ |
| ☐ Technical assistance/telephone consultation | |

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public?
(Check one)

- ☐ Yes
☐ No
☐ Don't know

Radiation releases/exposures

A. Source(s) for identifying events: (Check all that apply)

- | | |
|---|---|
| ☐ Phone call from citizen | ☐ Call from local health |
| ☐ Referral from another agency | ☐ Other |
| ☐ Stories in the media | ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event) |

B. Estimated number of events annually:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

C. Includes occupational exposure events?

- ☐ Yes
☐ No
☐ Don't know

D. What procedures for following up to identified events are in place? (Check all that apply):

- | | |
|--|---|
| ☐ Confirming event | ☐ Site visit/environmental exposure |
| ☐ Epi Investigation | ☐ Agency does not follow up on this type of environmental exposure event |
| ☐ Referral to local health | ☐ Other |
| ☐ Referral to regulatory agency | Specify other: _____ |
| ☐ Technical assistance/telephone consultation | |

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public?
(Check one)

- ☐ Yes
☐ No
☐ Don't know

Chemically contaminated products (not including food or water)

A. Source(s) for identifying events: (Check all that apply)

- | | |
|---|---|
| ☐ Phone call from citizen | ☐ Call from local health |
| ☐ Referral from another agency | ☐ Other |
| ☐ Stories in the media | ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event) |

B. Estimated number of events annually:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

C. Includes occupational exposure events?

- ☐ Yes
☐ No
☐ Don't know

D. What procedures for following up to identified events are in place? (Check all that apply):

- | | |
|--|---|
| ☐ Confirming event | ☐ Site visit/environmental exposure |
| ☐ Epi Investigation | ☐ Agency does not follow up on this type of environmental exposure event |
| ☐ Referral to local health | ☐ Other |
| ☐ Referral to regulatory agency | ☐ Specify other: _____ |
| ☐ Technical assistance/telephone consultation | |

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public? (Check one)

- ☐ Yes
☐ No
☐ Don't know

Chemically contaminated food

A. Source(s) for identifying events: (Check all that apply)

- | | |
|---|---|
| ☐ Phone call from citizen | ☐ Call from local health |
| ☐ Referral from another agency | ☐ Other |
| ☐ Stories in the media | ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event) |

B. Estimated number of events annually:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

C. Includes occupational exposure events?

- ☐ Yes

☐ No ☐ Don't know	
D. What procedures for following up to identified events are in place? (Check all that apply): ☐ Confirming event ☐ Epi Investigation ☐ Referral to local health ☐ Referral to regulatory agency ☐ Technical assistance/telephone consultation ☐ Site visit/environmental exposure ☐ Agency does not follow up on this type of environmental exposure event ☐ Other Specify other: _____	
E. Percent of events triggering follow-up actions: ____	
F. Are data on this type of environmental exposure event summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Chemically contaminated water	
A. Source(s) for identifying events: (Check all that apply) ☐ Phone call from citizen ☐ Referral from another agency ☐ Stories in the media ☐ Call from local health ☐ Other ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)	
B. Estimated number of events annually: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
C. Includes occupational exposure events? ☐ Yes ☐ No ☐ Don't know	
D. What procedures for following up to identified events are in place? (Check all that apply): ☐ Confirming event ☐ Epi Investigation ☐ Referral to local health ☐ Referral to regulatory agency ☐ Technical assistance/telephone consultation ☐ Site visit/environmental exposure ☐ Agency does not follow up on this type of environmental exposure event ☐ Other Specify other: _____	
E. Percent of events triggering follow-up actions: ____	
F. Are data on this type of environmental exposure event summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Mercury spills
A. Source(s) for identifying events: (Check all that apply) ☐ Phone call from citizen ☐ Referral from another agency ☐ Stories in the media ☐ Call from local health ☐ Other ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)
B. Estimated number of events annually: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000
C. Includes occupational exposure events? ☐ Yes ☐ No ☐ Don't know
D. What procedures for following up to identified events are in place? (Check all that apply): ☐ Confirming event ☐ Epi Investigation ☐ Referral to local health ☐ Referral to regulatory agency ☐ Technical assistance/telephone consultation ☐ Site visit/environmental exposure ☐ Agency does not follow up on this type of environmental exposure event ☐ Other Specify other: _____
E. Percent of events triggering follow-up actions: ____
F. Are data on this type of environmental exposure event summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know

Carbon monoxide releases
A. Source(s) for identifying events: (Check all that apply) ☐ Phone call from citizen ☐ Referral from another agency ☐ Stories in the media ☐ Call from local health ☐ Other ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)
B. Estimated number of events annually: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000
C. Includes occupational exposure events?



☐ Yes

☐ No

☐ Don't know

D. What procedures for following up to identified events are in place? (Check all that apply):

☐ Confirming event

☐ Site visit/environmental exposure

☐ Epi Investigation

☐ Agency does not follow up on this type of environmental exposure event

☐ Referral to local health

☐ Referral to regulatory agency

☐ Other

☐ Technical assistance/telephone consultation Specify other: _____

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public?
(Check one)

☐ Yes

☐ No

☐ Don't know

Pesticides misapplications/accidental exposures

A. Source(s) for identifying events: (Check all that apply)

☐ Phone call from citizen

☐ Call from local health

☐ Referral from another agency

☐ Other

☐ Stories in the media

☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)

B. Estimated number of events annually:

☐ 1-10

☐ 11-50

☐ 51-100

☐ 101-1000

☐ >1000

C. Includes occupational exposure events?

☐ Yes

☐ No

☐ Don't know

D. What procedures for following up to identified events are in place? (Check all that apply):

☐ Confirming event

☐ Site visit/environmental exposure

☐ Epi Investigation

☐ Agency does not follow up on this type of environmental exposure event

☐ Referral to local health

☐ Referral to regulatory agency

☐ Other

☐ Technical assistance/telephone consultation Specify other: _____

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public?
(Check one)

☐ Yes

☐ No

☐ Don't know

Other chemical spills/releases

A. Source(s) for identifying events: (Check all that apply)

- | | |
|---|---|
| ☐ Phone call from citizen | ☐ Call from local health |
| ☐ Referral from another agency | ☐ Other |
| ☐ Stories in the media | ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event) |

B. Estimated number of events annually:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

C. Includes occupational exposure events?

- ☐ Yes
☐ No
☐ Don't know

D. What procedures for following up to identified events are in place? (Check all that apply):

- | | |
|--|---|
| ☐ Confirming event | ☐ Site visit/environmental exposure |
| ☐ Epi Investigation | ☐ Agency does not follow up on this type of environmental exposure event |
| ☐ Referral to local health | ☐ Other |
| ☐ Referral to regulatory agency | ☐ Technical assistance/telephone consultation |
| Specify other: _____ | |

E. Percent of events triggering follow-up actions: ____

F. Are data on this type of environmental exposure event summarized and made public? (Check one)

- ☐ Yes
☐ No
☐ Don't know

Other #1 (Please specify other _____)

A. Source(s) for identifying events: (Check all that apply)

- | | |
|---|---|
| ☐ Phone call from citizen | ☐ Call from local health |
| ☐ Referral from another agency | ☐ Other |
| ☐ Stories in the media | ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event) |

B. Estimated number of events annually:

- ☐ 1-10
☐ 11-50
☐ 51-100
☐ 101-1000
☐ >1000

C. Includes occupational exposure events? ☐ Yes ☐ No ☐ Don't know	
D. What procedures for following up to identified events are in place? (Check all that apply): ☐ Confirming event ☐ Epi Investigation ☐ Referral to local health ☐ Referral to regulatory agency ☐ Technical assistance/telephone consultation ☐ Site visit/environmental exposure ☐ Agency does not follow up on this type of environmental exposure event ☐ Other Specify other: _____	
E. Percent of events triggering follow-up actions: ____	
F. Are data on this type of environmental exposure event summarized and made public? (Check one) ☐ Yes ☐ No ☐ Don't know	

Other #2 (Please specify other _____)	
A. Source(s) for identifying events: (Check all that apply) ☐ Phone call from citizen ☐ Referral from another agency ☐ Stories in the media ☐ Call from local health ☐ Other ☐ Agency does not monitor this type of environmental exposure event (move on to next exposure event)	
B. Estimated number of events annually: ☐ 1-10 ☐ 11-50 ☐ 51-100 ☐ 101-1000 ☐ >1000	
C. Includes occupational exposure events? ☐ Yes ☐ No ☐ Don't know	
D. What procedures for following up to identified events are in place? (Check all that apply): ☐ Confirming event ☐ Epi Investigation ☐ Referral to local health ☐ Referral to regulatory agency ☐ Technical assistance/telephone consultation ☐ Site visit/environmental exposure ☐ Agency does not follow up on this type of environmental exposure event ☐ Other Specify other: _____	
E. Percent of events triggering follow-up actions: ____	
F. Are data on this type of environmental exposure event summarized and made public? (Check one)	

☐ Yes
☐ No
☐ Don't know

5. Provide brief narrative and/ or URL links to websites to exemplify exposure investigations related to environmental exposure events, if available.

6. Overall, approximately how many FTEs are devoted to environmental illness/injury/exposure/contamination monitoring and investigation activities in your program?

Environmental (excluding occupational): ____
 Occupational: ____
 Total ____

7. What are barriers to monitoring of and response to environmentally related health conditions and exposure events in your agency? (check all that apply)

☐ Inadequately trained staff
☐ Inadequate resources to support activities (e.g., dedicated staff, computers, and travel funds)
☐ No access to data sources to identify conditions/events
☐ Not reportable so not done
☐ Systems/procedures (e.g., case definitions, investigation guidelines, protocols, process etc) not in place
☐ Resistance of local health departments to respond to these types of events
☐ Other (Please specify: _____)

8. Would your state be interested in expanding on current acute environmental exposure and health monitoring activities if resources and/or supporting materials were available?

☐ Yes
☐ No
☐ Depends (Please explain: _____)

9. Would you be willing to share information about your procedures (protocols, data collection instruments, data dictionaries etc.) with CSTE and with other states?

☐ Yes
☐ No
☐ None to share

10. Please feel free to add any comments about this subject and this assessment.

APPENDIX B – SUMMARIES BY HEALTH CONDITION

List of Tables

Table 1. Summary of Childhood Lead Toxicity

Table 2. Summary of Adult Lead Toxicity

Table 3. Summary of Mercury Toxicity

Table 4. Summary of Arsenic Toxicity

Table 5. Summary of Cadmium Toxicity

Table 6. Summary of Acute Pesticide Injury or Illness

Table 7. Summary of Acute Respiratory Disease Related to Chemical Exposures

Table 8. Summary of Acute Disease Cluster Possibly Linked to an Environmental Exposure

Table 9. Summary of Methemoglobinemia

Table 10. Summary of Carbon Monoxide (CO) Poisoning

Table 11. Summary of Hyperthermia (Morbidity/Mortality)

Appendix B: Table 1. Summary of Childhood Lead Toxicity

Childhood Lead Toxicity			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	40	88.9
	No	3	6.7
	Don't know	0	0.0
	Missing	2	4.4
Sources of report¹	Physicians	32	71.1
	Laboratories	43	95.6
	Poison Control	5	11.1
	Syndromic surveillance	2	4.4
	Referral from another agency	13	28.9
	Review of existing health data	2	4.4
	Phone call from citizen	12	26.7
	Does not collect data	2	4.4
	Total sources: mean (SD)	2.4	(1.5)
	Total sources: median (range)	2.0	(0-7)
Estimated number of cases annually²	1–100 cases	13	30.2
	101–1,000 cases	13	30.2
	>1,000 cases	17	39.5
	Missing	0	0.0
Procedures for follow-up²	Case-patient interview	31	72.1
	Medical record review	17	39.5
	Exposure investigation	37	86.0
	Other procedure	13	30.2
	Total procedures: mean (SD)	2.3	(0.8)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(1-4)
	0%	4	9.3
	1%–49%	17	39.5
	50%–99%	1	2.3
	100%	9	20.9
	Missing	12	27.9
Are case data summarized and made public?²	Yes	32	74.4
	No	9	20.9
	Don't know	2	4.7
	Missing	0	0.0
Are exposure investigation results summarized and made public?²	Yes	13	30.2
	No	27	62.8
	Don't know	3	7.0
	Missing	0	0.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 43).

Appendix B: Table 2. Summary of Adult Lead Toxicity

Adult Lead Toxicity			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	37	82.2
	No	8	17.8
	Don't know	0	0.0
	Missing	0	0.0
Sources of report¹	Physicians	29	64.4
	Laboratories	40	88.9
	Poison Control	6	13.3
	Syndromic surveillance	3	6.7
	Referral from another agency	12	26.7
	Review of existing health data	2	4.4
	Phone call from citizen	9	20.0
	Does not collect data	4	8.9
	Total sources: mean (SD)	2.2	(1.6)
	Total sources: median (range)	2.0	(0–7)
Estimated number of cases annually²	1–100 cases	18	43.9
	101–1,000 cases	13	31.7
	>1,000 cases	8	19.5
	Missing	2	4.9
Procedures for follow-up²	Case-patient interview	24	58.5
	Medical record review	11	26.8
	Exposure investigation	18	43.9
	Other procedure	18	43.9
	Total procedures: mean (SD)	1.7	(1.0)
	Total procedures: median (range)	2.0	(0–4)
Percent cases triggering an investigation annually²	0%	15	36.6
	1%–49%	12	29.3
	50%–99%	0	0.0
	100%	2	4.9
	Missing	12	29.3
Are case data summarized and made public?²	Yes	25	61.0
	No	12	29.3
	Don't know	2	4.9
	Missing	2	4.9
Are exposure investigation results summarized and made public?²	Yes	7	17.1
	No	27	65.9
	Don't know	4	9.8
	Missing	3	7.3

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 41).

Appendix B: Table 3. Summary of Mercury Toxicity

Mercury Toxicity			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	16	35.6
	Yes - Occupational Only	5	11.1
	No	23	51.1
	Don't know	1	2.2
	Missing	0	0.0
Sources of report¹	Physicians	20	44.4
	Laboratories	18	40.0
	Poison Control	14	31.1
	Syndromic surveillance	4	8.9
	Referral from another agency	11	24.4
	Review of existing health data	2	4.4
	Phone call from citizen	11	24.4
	Does not collect data	20	44.4
	Total sources: mean (SD)	1.8	(2.0)
	Total sources: median (range)	1.0	(0–7)
Estimated number of cases annually²	1–100 cases	19	76.0
	101–1,000 cases	1	4.0
	>1,000 cases	1	4.0
	Missing	4	16.0
Do these include occupational cases?²	Yes	19	76.0
	No	3	12.0
	Don't know	1	4.0
	Missing	2	8.0
Procedures for follow-up²	Case-patient interview	19	76.0
	Medical record review	9	36.0
	Exposure investigation	16	64.0
	Other procedure	6	24.0
	Total procedures: mean (SD)	2.0	(0.9)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(0–3)
	0%	5	20.0
	1%–49%	6	24.0
	50%–99%	3	12.0
	100%	3	12.0
Are case data summarized and made public?²	Missing	8	32.0
	Yes	13	52.0
	No	9	36.0
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	3	12.0
	Yes	9	36.0
	No	12	48.0
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	4	16.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 25).

Appendix B: Table 4. Summary of Arsenic Toxicity

Arsenic Toxicity			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	16	35.6
	Yes - Occupational Only	2	4.4
	No	26	57.8
	Don't know	1	2.2
	Missing	0	0.0
Sources of report¹	Physicians	16	35.6
	Laboratories	18	40.0
	Poison Control	10	22.2
	Syndromic surveillance	4	8.9
	Referral from another agency	9	20.0
	Review of existing health data	2	4.4
	Phone call from citizen	10	22.2
	Does not collect data	23	51.1
	Total sources: mean (SD)	1.5	(2.0)
	Total sources: median (range)	0.0	(0–7)
Estimated number of cases annually²	1–100 cases	14	63.6
	101–1,000 cases	1	4.5
	>1,000 cases	0	0.0
	Missing	7	31.8
Do these include occupational cases?²	Yes	15	68.2
	No	1	4.5
	Don't know	2	9.1
	Missing	4	18.2
Procedures for follow-up²	Case-patient interview	17	77.3
	Medical record review	9	40.9
	Exposure investigation	14	63.6
	Other procedure	5	22.7
	Total procedures: mean (SD)	2.0	(1.0)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(0–4)
	0%	5	22.7
	1%–49%	4	18.2
	50%–99%	1	4.5
	100%	3	13.6
Are case data summarized and made public?²	Missing	9	40.9
	Yes	9	40.9
	No	13	59.1
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	0	0.0
	Yes	6	27.3
	No	15	68.2
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	1	4.5

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 22).

Appendix B: Table 5. Summary of Cadmium Toxicity

Cadmium Toxicity			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	12	26.7
	Yes - Occupational Only	3	6.7
	No	27	60.0
	Don't know	2	4.4
	Missing	1	2.2
Sources of report¹	Physicians	12	26.7
	Laboratories	18	40.0
	Poison Control	6	13.3
	Syndromic surveillance	4	8.9
	Referral from another agency	6	13.3
	Review of existing health data	2	4.4
	Phone call from citizen	6	13.3
	Does not collect data	27	60.0
	Total sources: mean (SD)	1.2	(1.9)
	Total sources: median (range)	0.0	(0–7)
Estimated number of cases annually²	1–100 cases	12	66.7
	101–1,000 cases	0	0.0
	>1,000 cases	0	0.0
	Missing	6	33.3
Do these include occupational cases?²	Yes	15	83.3
	No	1	5.6
	Don't know	2	11.1
	Missing	0	0.0
Procedures for follow-up²	Case-patient interview	12	66.7
	Medical record review	5	27.8
	Exposure investigation	9	50.0
	Other procedure	8	44.4
	Total procedures: mean (SD)	1.9	(1.2)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(0–4)
	0%	6	33.3
	1%–49%	4	22.2
	50%–99%	1	5.6
	100%	2	11.1
Are case data summarized and made public?²	Missing	5	27.8
	Yes	7	38.9
	No	11	61.1
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	0	0.0
	Yes	3	16.7
	No	14	77.8
	Don't know	0	0.0
	Missing	1	5.6

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 18).

Appendix B: Table 6. Summary of Acute Pesticide Injury or Illness

Acute Pesticide Injury/Illness			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	19	42.2
	Yes - Occupational Only	6	13.3
	No	20	44.4
	Don't know	0	0.0
	Missing	0	0.0
Sources of report¹	Physicians	23	51.1
	Laboratories	18	40.0
	Poison Control	25	55.6
	Syndromic surveillance	3	6.7
	Referral from another agency	23	51.1
	Review of existing health data	9	20.0
	Phone call from citizen	17	37.8
	Does not collect data	15	33.3
	Total sources: mean (SD)	2.6	(2.2)
	Total sources: median (range)	3.0	(0–7)
Estimated number of cases annually²	1–100 cases	16	53.3
	101–1,000 cases	8	26.7
	>1,000 cases	1	3.3
	Missing	5	16.7
Do these include occupational cases?²	Yes	26	86.7
	No	0	0.0
	Don't know	0	0.0
	Missing	4	13.3
Procedures for follow-up²	Case-patient interview	23	76.7
	Medical record review	15	50.0
	Exposure investigation	16	53.3
	Other procedure	7	23.3
	Total procedures: mean (SD)	2.0	(1.2)
	Total procedures: median (range)	2.0	(0–4)
Percent cases triggering an investigation annually²	0%	3	10.0
	1%–49%	11	36.7
	50%–99%	2	6.7
	100%	2	6.7
	Missing	12	40.0
Are case data summarized and made public?²	Yes	16	53.3
	No	10	33.3
	Don't know	0	0.0
	Missing	4	13.3
Are exposure investigation results summarized and made public?²	Yes	9	30.0
	No	13	43.3
	Don't know	2	6.7
	Missing	6	20.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 30).

Appendix B: Table 7. Summary of Acute Respiratory Disease Related to Chemical Exposures

Acute Respiratory Disease			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	8	17.8
	Yes - Occupational Only	8	17.8
	No	27	60.0
	Don't know	2	4.4
	Missing	0	0.0
Sources of report¹	Physicians	17	37.8
	Laboratories	8	17.8
	Poison Control	11	24.4
	Syndromic surveillance	3	6.7
	Referral from another agency	14	31.1
	Review of existing health data	3	6.7
	Phone call from citizen	13	28.9
	Does not collect data	25	55.6
	Total sources: mean (SD)	1.5	(1.9)
	Total sources: median (range)	0.0	(0–6)
Estimated number of cases annually²	1–100 cases	13	65.0
	101–1,000 cases	2	10.0
	>1,000 cases	0	0.0
	Missing	5	25.0
Do these include occupational cases?²	Yes	15	75.0
	No	2	10.0
	Don't know	2	10.0
	Missing	1	5.0
Procedures for follow-up²	Case-patient interview	15	75.0
	Medical record review	11	55.0
	Exposure investigation	12	60.0
	Other procedure	3	15.0
	Total procedures: mean (SD)	2.1	(1.0)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(0–3)
	0%	2	10.0
	1%–49%	7	35.0
	50%–99%	4	20.0
	100%	1	5.0
Are case data summarized and made public?²	Missing	6	30.0
	Yes	8	40.0
	No	8	40.0
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	4	20.0
	Yes	3	15.0
	No	11	55.0
	Don't know	1	5.0
Are exposure investigation results summarized and made public?²	Missing	5	25.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 20).

Appendix B: Table 8. Summary of Acute Disease Cluster Possibly Linked to an Environmental Exposure

Acute Disease Cluster			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	18	40.0
	Yes - Occupational Only	1	2.2
	No	24	53.3
	Don't know	2	4.4
	Missing	0	0.0
Sources of report¹	Physicians	22	48.9
	Laboratories	14	31.1
	Poison Control	15	33.3
	Syndromic surveillance	11	24.4
	Referral from another agency	21	46.7
	Review of existing health data	5	11.1
	Phone call from citizen	23	51.1
	Does not collect data	18	40.0
	Total sources: mean (SD)	2.5	(2.5)
	Total sources: median (range)	2.0	(0–7)
Estimated number of cases annually²	1–100 cases	20	74.1
	101–1,000 cases	0	0.0
	>1,000 cases	1	3.7
	Missing	6	22.2
Do these include occupational cases?²	Yes	21	77.8
	No	3	11.1
	Don't know	1	3.7
	Missing	2	7.4
Procedures for follow-up²	Case-patient interview	19	70.4
	Medical record review	14	51.9
	Exposure investigation	18	66.7
	Other procedure	3	11.1
	Total procedures: mean (SD)	2.0	(1.1)
Percent cases triggering an investigation annually²	Total procedures: median (range)	2.0	(0–4)
	0%	3	11.1
	1%–49%	5	18.5
	50%–99%	4	14.8
	100%	6	22.2
Are case data summarized and made public?²	Missing	9	33.3
	Yes	10	37.0
	No	14	51.9
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	3	11.1
	Yes	11	40.7
	No	12	44.4
	Don't know	0	0.0
	Missing	4	14.8

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 27).

Appendix B: Table 9. Summary of Methemoglobinemia

Methemoglobinemia			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	4	8.9
	Yes - Occupational Only	1	2.2
	No	36	80.0
	Don't know	4	8.9
	Missing	0	0.0
Sources of report¹	Physicians	9	20.0
	Laboratories	8	17.8
	Poison Control	6	13.3
	Syndromic surveillance	4	8.9
	Referral from another agency	6	13.3
	Review of existing health data	1	2.2
	Phone call from citizen	6	13.3
	Does not collect data	35	77.8
	Total sources: mean (SD)	0.9	(1.9)
	Total sources: median (range)	0.0	(0–7)
Estimated number of cases annually²	1–100 cases	7	70.0
	101–1,000 cases	0	0.0
	>1,000 cases	0	0.0
	Missing	3	30.0
Do these include occupational cases?²	Yes	5	50.0
	No	3	30.0
	Don't know	1	10.0
	Missing	1	10.0
Procedures for follow-up²	Case-patient interview	7	70.0
	Medical record review	6	60.0
	Exposure investigation	6	60.0
	Other procedure	1	10.0
	Total procedures: mean (SD)	2.0	(1.5)
	Total procedures: median (range)	2.5	(0–4)
Percent cases triggering an investigation annually²	0%	2	20.0
	1%–49%	2	20.0
	50%–99%	1	10.0
	100%	2	20.0
	Missing	3	30.0
Are case data summarized and made public?²	Yes	3	30.0
	No	6	60.0
	Don't know	0	0.0
	Missing	1	10.0
Are exposure investigation results summarized and made public?²	Yes	1	10.0
	No	8	80.0
	Don't know	0	0.0
	Missing	1	10.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 10).

Appendix B: Table 10. Summary of Carbon Monoxide (CO) Poisoning

CO Poisoning			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	13	28.9
	Yes - Occupational Only	2	4.4
	No	27	60.0
	Don't know	3	6.7
	Missing	0	0.0
Sources of report¹	Physicians	18	40.0
	Laboratories	11	24.4
	Poison Control	13	28.9
	Syndromic surveillance	10	22.2
	Referral from another agency	10	22.2
	Review of existing health data	8	17.8
	Phone call from citizen	10	22.2
	Does not collect data	22	48.9
	Total sources: mean (SD)	1.8	(2.1)
	Total sources: median (range)	1.0	(0–6)
Estimated number of cases annually²	1–100 cases	12	52.2
	101–1,000 cases	10	43.5
	>1,000 cases	0	0.0
	Missing	1	4.3
Do these include occupational cases?²	Yes	16	69.6
	No	2	8.7
	Don't know	5	21.7
	Missing	0	0.0
Procedures for follow-up²	Case-patient interview	9	39.1
	Medical record review	8	34.8
	Exposure investigation	8	34.8
	Other procedure	7	30.4
	Total procedures: mean (SD)	1.4	(1.3)
Percent cases triggering an investigation annually²	Total procedures: median (range)	1.0	(0–4)
	0%	8	34.8
	1%–49%	7	30.4
	50%–99%	2	8.7
	100%	1	4.3
Are case data summarized and made public?²	Missing	5	21.7
	Yes	14	60.9
	No	8	34.8
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	1	4.3
	Yes	3	13.0
	No	17	73.9
	Don't know	1	4.3
	Missing	2	8.7

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 23).

Appendix B: Table 11. Summary of Hyperthermia (Morbidity/Mortality)

Hyperthermia			
Variable	Category	No.	%
Is condition legally reportable?¹	Yes	1	2.2
	Yes - Occupational Only	2	4.4
	No	40	88.9
	Don't know	1	2.2
	Missing	1	2.2
Sources of report¹	Physicians	4	8.9
	Laboratories	0	0.0
	Poison Control	0	0.0
	Syndromic surveillance	9	20.0
	Referral from another agency	3	6.7
	Review of existing health data	9	20.0
	Phone call from citizen	1	2.2
	Does not collect data	30	66.7
	Total sources: mean (SD)	0.6	(1.1)
	Total sources: median (range)	0.0	(0–5)
Estimated number of cases annually²	1–100 cases	6	40.0
	101–1,000 cases	0	0.0
	>1,000 cases	4	26.7
	Missing	5	33.3
Do these include occupational cases?²	Yes	9	60.0
	No	0	0.0
	Don't know	2	13.3
	Missing	4	26.7
Procedures for follow-up²	Case-patient interview	1	6.7
	Medical record review	2	13.3
	Exposure investigation	1	6.7
	Other procedure	1	6.7
	Total procedures: mean (SD)	0.3	(0.7)
Percent cases triggering an investigation annually²	Total procedures: median (range)	0.0	(0–2)
	0%	2	13.3
	1%–49%	3	20.0
	50%–99%	0	0.0
	100%	0	0.0
Are case data summarized and made public?²	Missing	10	66.7
	Yes	8	53.3
	No	4	26.7
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	3	20.0
	Yes	1	6.7
	No	10	66.7
	Don't know	0	0.0
Are exposure investigation results summarized and made public?²	Missing	4	26.7
	Yes	1	6.7
	No	10	66.7
	Don't know	0	0.0
	Missing	4	26.7

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 15).

APPENDIX C – SUMMARIES BY EXPOSURE EVENT

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Appendix C: Table 1. Summary of Mold Exposure Events

Mold			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	34	75.6
	Referral from another agency	27	60.0
	Stories in the media	8	17.8
	Call from local health	28	62.2
	Other	3	6.7
	Does not collect data	11	24.4
	Total sources: mean (SD)	2.2	(1.5)
	Total sources: median (range)	3.0	(0–5)
Estimated number of events annually²	1–100 cases	11	32.4
	101–1,000 cases	18	52.9
	>1,000 cases	3	8.8
	Missing	2	5.9
Do these include occupational exposure events?²	Yes	23	67.6
	No	6	17.6
	Don't know	4	11.8
	Missing	1	2.9
Procedures for follow-up²	Confirming event	9	26.5
	Epi investigation	5	14.7
	Referral to local health	10	29.4
	Referral to regulatory agency	15	44.1
	Technical assistance/consultation	30	88.2
	Site visit	12	35.3
	Other	6	17.6
	Total procedures: mean (SD)	2.6	(1.4)
Percent events triggering follow-up action annually²	Total procedures: median (range)	2.5	(0–6)
	0%	5	14.7
	1%–49%	7	20.6
	50%–99%	3	8.8
	100%	8	23.5
	Missing	11	32.4
Are data on this type of environmental exposure event summarized and made public?²	Yes	3	8.8
	No	25	73.5
	Don't know	0	0.0
	Missing	6	17.6

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 34).

Appendix C: Table 2. Summary of Radiation Release/Exposure Events

Radiation Releases/Exposures			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	22	48.9
	Referral from another agency	25	55.6
	Stories in the media	18	40.0
	Call from local health	15	33.3
	Other	17	37.8
	Does not collect data	14	31.1
	Total sources: mean (SD)	2.2	(1.8)
	Total sources: median (range)	2.0	(0–5)
Estimated number of events annually²	1–100 cases	22	71.0
	101–1,000 cases	3	9.7
	>1,000 cases	0	0.0
	Missing	6	19.4
Do these include occupational exposure events?²	Yes	28	90.3
	No	0	0.0
	Don't know	0	0.0
	Missing	3	9.7
Procedures for follow-up²	Confirming event	19	61.3
	Epi investigation	9	29.0
	Referral to local health	6	19.4
	Referral to regulatory agency	16	51.6
	Technical assistance/consultation	22	71.0
	Site visit	22	71.0
	Other	7	22.6
	Total procedures: mean (SD)	3.3	(1.9)
Percent events triggering follow-up action annually²	Total procedures: median (range)	3.0	(0–6)
	0%	2	6.5
	1%–49%	4	12.9
	50%–99%	3	9.7
	100%	12	38.7
	Missing	10	32.3
Are data on this type of environmental exposure event summarized and made public?²	Yes	7	22.6
	No	17	54.8
	Don't know	1	3.2
	Missing	6	19.4

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 31).

Appendix C: Table 3. Summary of Chemically Contaminated Product Events

Chemically Contaminated Products			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	21	46.7
	Referral from another agency	20	44.4
	Stories in the media	7	15.6
	Call from local health	20	44.4
	Other	6	13.3
	Does not collect data	19	42.2
	Total sources: mean (SD)	1.6	(1.6)
	Total sources: median (range)	2.0	(0–5)
Estimated number of events annually²	1–100 cases	20	76.9
	101–1,000 cases	1	3.8
	>1,000 cases	0	0.0
	Missing	5	19.2
Do these include occupational exposure events?²	Yes	12	46.2
	No	5	19.2
	Don't know	2	7.7
	Missing	7	26.9
Procedures for follow-up²	Confirming event	13	50.0
	Epi investigation	10	38.5
	Referral to local health	9	34.6
	Referral to regulatory agency	18	69.2
	Technical assistance/consultation	20	76.9
	Site visit	11	42.3
	Other	2	7.7
	Total procedures: mean (SD)	3.2	(1.9)
Percent events triggering follow-up action annually²	Total procedures: median (range)	3.0	(0–6)
	0%	3	11.5
	1%–49%	5	19.2
	50%–99%	3	11.5
	100%	6	23.1
	Missing	9	34.6
Are data on this type of environmental exposure event summarized and made public?²	Yes	6	23.1
	No	15	57.7
	Don't know	0	0.0
	Missing	5	19.2

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 26).

Appendix C: Table 4. Summary of Chemically Contaminated Food Events

Chemically Contaminated Foods			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	31	68.9
	Referral from another agency	31	68.9
	Stories in the media	15	33.3
	Call from local health	26	57.8
	Other	6	13.3
	Does not collect data	12	26.7
	Total sources: mean (SD)	2.4	(1.7)
	Total sources: median (range)	3.0	(0–5)
Estimated number of events annually²	1–100 cases	28	84.8
	101–1,000 cases	1	3.0
	>1,000 cases	0	0.0
	Missing	4	12.1
Do these include occupational exposure events?²	Yes	14	42.4
	No	14	42.4
	Don't know	4	12.1
	Missing	1	3.0
Procedures for follow-up²	Confirming event	23	69.7
	Epi investigation	24	72.7
	Referral to local health	22	66.7
	Referral to regulatory agency	26	78.8
	Technical assistance/consultation	22	66.7
	Site visit	23	69.7
	Other	1	3.0
	Total procedures: mean (SD)	4.3	(1.7)
Percent events triggering follow-up action annually²	Total procedures: median (range)	5.0	(0–6)
	0%	0	0.0
	1%–49%	5	15.2
	50%–99%	3	9.1
	100%	16	48.5
	Missing	9	27.3
Are data on this type of environmental exposure event summarized and made public?²	Yes	8	24.2
	No	22	66.7
	Don't know	1	3.0
	Missing	2	6.1

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 33).

Appendix C: Table 5. Summary of Chemically Contaminated Water Events

Chemically Contaminated Water			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	32	71.1
	Referral from another agency	33	73.3
	Stories in the media	15	33.3
	Call from local health	30	66.7
	Other	7	15.6
	Does not collect data	9	20.0
	Total sources: mean (SD)	2.6	(1.6)
	Total sources: median (range)	3.0	(0–5)
Estimated number of events annually²	1–100 cases	24	66.7
	101–1,000 cases	2	5.6
	>1,000 cases	2	5.6
	Missing	8	22.2
Do these include occupational exposure events?²	Yes	14	38.9
	No	12	33.3
	Don't know	5	13.9
	Missing	5	13.9
Procedures for follow-up²	Confirming event	22	61.1
	Epi investigation	14	38.9
	Referral to local health	16	44.4
	Referral to regulatory agency	24	66.7
	Technical assistance/consultation	25	69.4
	Site visit	22	61.1
	Other	2	5.6
	Total procedures: mean (SD)	3.5	(1.9)
Percent events triggering follow-up action annually²	Total procedures: median (range)	3.0	(0–6)
	0%	1	2.8
	1%–49%	3	8.3
	50%–99%	3	8.3
	100%	20	55.6
	Missing	9	25.0
Are data on this type of environmental exposure event summarized and made public?²	Yes	14	38.9
	No	13	36.1
	Don't know	3	8.3
	Missing	6	16.7

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 36).

Appendix C: Table 6. Summary of Mercury Spill Events

Mercury Spills			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	28	62.2
	Referral from another agency	28	62.2
	Stories in the media	6	13.3
	Call from local health	23	51.1
	Other	4	8.9
	Does not collect data	15	33.3
	Total sources: mean (SD)	2.0	(1.6)
	Total sources: median (range)	3.0	(0–5)
Estimated number of events annually²	1–100 cases	28	93.3
	101–1,000 cases	0	0.0
	>1,000 cases	0	0.0
	Missing	2	6.7
Do these include occupational exposure events?²	Yes	23	76.7
	No	5	16.7
	Don't know	1	3.3
	Missing	1	3.3
Procedures for follow-up²	Confirming event	13	43.3
	Epi investigation	7	23.3
	Referral to local health	11	36.7
	Referral to regulatory agency	19	63.3
	Technical assistance/consultation	25	83.3
	Site visit	18	60.0
	Other	3	10.0
	Total procedures: mean (SD)	3.2	(1.6)
	Total procedures: median (range)	3.0	(0–6)
Percent events triggering follow-up action annually²	0%	3	10.0
	1%–49%	4	13.3
	50%–99%	4	13.3
	100%	16	53.3
	Missing	3	10.0
Are data on this type of environmental exposure event summarized and made public?²	Yes	7	23.3
	No	20	66.7
	Don't know	0	0.0
	Missing	3	10.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 30).

Appendix C: Table 7. Summary of Carbon Monoxide (CO) Release Events

CO Releases			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	16	35.6
	Referral from another agency	16	35.6
	Stories in the media	5	11.1
	Call from local health	13	28.9
	Other	3	6.7
	Does not collect data	28	62.2
	Total sources: mean (SD)	1.2	(1.6)
	Total sources: median (range)	0.0	(0–4)
Estimated number of events annually²	1–100 cases	12	70.6
	101–1,000 cases	3	17.6
	>1,000 cases	0	0.0
	Missing	2	11.8
Do these include occupational exposure events?²	Yes	11	64.7
	No	1	5.9
	Don't know	2	11.8
	Missing	3	17.6
Procedures for follow-up²	Confirming event	7	41.2
	Epi investigation	6	35.3
	Referral to local health	8	47.1
	Referral to regulatory agency	10	58.8
	Technical assistance/consultation	12	70.6
	Site visit	8	47.1
	Other	0	0.0
	Total procedures: mean (SD)	3.0	(2.2)
Percent events triggering follow-up action annually²	Total procedures: median (range)	3.0	(0–6)
	0%	2	11.8
	1%–49%	6	35.3
	50%–99%	0	0.0
	100%	5	29.4
	Missing	4	23.5
Are data on this type of environmental exposure event summarized and made public?²	Yes	7	41.2
	No	7	41.2
	Don't know	0	0.0
	Missing	3	17.6

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 17).

Appendix C: Table 8. Summary of Pesticide Misapplication/Accidental Exposure Events

Pesticide Exposures			
Variable	Category	No.	%
Sources for identifying events¹	Phone call from citizen	16	35.6
	Referral from another agency	17	37.8
	Stories in the media	6	13.3
	Call from local health	13	28.9
	Other	7	15.6
	Does not collect data	27	60.0
	Total sources: mean (SD)	1.3	(1.8)
	Total sources: median (range)	0.0	(0–5)
Estimated number of events annually²	1–100 cases	13	72.2
	101–1,000 cases	2	11.1
	>1,000 cases	0	0.0
	Missing	3	16.7
Do these include occupational exposure events?²	Yes	11	61.1
	No	5	27.8
	Don't know	0	0.0
	Missing	2	11.1
Procedures for follow-up²	Confirming event	7	38.9
	Epi investigation	5	27.8
	Referral to local health	9	50.0
	Referral to regulatory agency	15	83.3
	Technical assistance/consultation	14	77.8
	Site visit	8	44.4
	Other	3	16.7
	Total procedures: mean (SD)	3.4	(1.7)
	Total procedures: median (range)	3.5	(0–6)
Percent events triggering follow-up action annually²	0%	1	5.6
	1%–49%	4	22.2
	50%–99%	2	11.1
	100%	6	33.3
	Missing	5	27.8
Are data on this type of environmental exposure event summarized and made public?²	Yes	5	27.8
	No	10	55.6
	Don't know	0	0.0
	Missing	3	16.7

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 18).

Appendix C: Table 9. Summary of Other Chemical Spill/Release Events

Other Chemical Spills/Releases			
Variable	Category	No.	%
Sources for identifying events ¹	Phone call from citizen	17	37.8
	Referral from another agency	21	46.7
	Stories in the media	11	24.4
	Call from local health	19	42.2
	Other	5	11.1
	Does not collect data	22	48.9
	Total sources: mean (SD)	1.6	(1.8)
	Total sources: median (range)	1.0	(0–5)
Estimated number of events annually ²	1–100 cases	13	56.5
	101–1,000 cases	6	26.1
	>1,000 cases	2	8.7
	Missing	2	8.7
Do these include occupational exposure events? ²	Yes	15	65.2
	No	4	17.4
	Don't know	1	4.3
	Missing	3	13.0
Procedures for follow-up ²	Confirming event	13	56.5
	Epi investigation	8	34.8
	Referral to local health	14	60.9
	Referral to regulatory agency	17	73.9
	Technical assistance/consultation	18	78.3
	Site visit	9	39.1
	Other	4	17.4
	Total procedures: mean (SD)	3.6	(2.0)
Percent events triggering follow-up action annually ²	Total procedures: median (range)	4.0	(0–7)
	0%	2	8.7
	1%–49%	6	26.1
	50%–99%	4	17.4
	100%	3	13.0
	Missing	8	34.8
Are data on this type of environmental exposure event summarized and made public? ²	Yes	9	39.1
	No	11	47.8
	Don't know	0	0.0
	Missing	3	13.0

¹Of all 45 respondents.²Of respondents reporting that data are collected on the condition of interest (n = 23).



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